MAY 19, 1956 Oct 8 PAGES 701 TO 760

THE LANCET

Offices: 7, ADAM STREET, ADELPHI, W.C.2

Telegrams: LANCET, RAND, LONDON Telephone: TEMPLE BAR 7228 and 7229

No. XX OF VOL. I, 1956
No. 6925 VOL. CCLXX

LONDON, SATURDAY, MAY 19, 1956
Founded 1823 PUBLISHED WEEKLY Registered as a Newspaper

Pp. 128—Price 1s. 6d.
Annual Subscription: £3 3s.

JUN 4 - 1956
Guest Copy

The *complete* answer
for macrocytic anæmias
'ANAHÆMIN'

Literature and specimen packings are available on request

THE BRITISH DRUG HOUSES LTD. (Medical Department) LONDON N.1

Recently Issued.

THE GENESIS AND PREVENTION OF CANCER

By W. SAMPSON HANDLEY, M.S., F.R.C.S.
Consultant Surgeon to the Middlesex Hospital

Second Edition with 2 new chapters 21s. net.

London: John Murray. New York: The Macmillan Co.

Third Edition

INTRODUCTION TO DISEASES OF THE CHEST

By JAMES MAXWELL, M.D.(Lond.), F.R.C.P.(Lond.)
Physician, Royal Chest Hospital; Physician to the Ministry's Mass X-ray Unit; Consulting Physician, Royal National Sanatorium, Bournemouth; late Physician, St. Bartholomew's Hospital.

Demy 8vo 308 + xii 66 Half-tone Illustrations

12s. 6d. net, plus 8d. postage.

Hodder & Stoughton Ltd., 20, Warwick-square, London, E.C.4

Sixth Edition *Now available*

PRINCIPLES OF MEDICAL STATISTICS

By A. BRADFORD HILL, C.B.E., D.Sc., Ph.D., F.R.S.

Demy 8vo 314 + x 10s. 6d. net, plus 6d. postage

Revised and enlarged (containing a new chapter on Clinical Trials and 16 pages of random sampling numbers).

The Lancet Limited, 7, Adam-street, Adelphi, London, W.C.2

UNITED STATES OF AMERICA AND CANADIAN SELLING RIGHTS HELD BY OXFORD UNIVERSITY PRESS, INC.
114, Fifth Avenue, New York 11, N.Y., U.S.A.

Third Edition

ABDOMINAL OPERATIONS

By RODNEY MAINGOT, F.R.C.S.
Surgeon, Royal Free Hospital

Completely revised. 74 Chapters (11 new). 1594 Illustrations 11 Colour Plates. 1568 Pages. Price £8 10s. net.

H. K. Lewis & Co. Ltd., 136, Gower-street, W.C.1

THE LAW AND ETHICS OF DENTAL PRACTICE

By R. W. DURAND, M.R.C.S., L.R.C.P.
Formerly Secretary of the Medical Protection Society
and
D. MORGAN, L.D.S. (Leeds)
Formerly Deputy Dental Secretary of the British Dental Association

Foreword by Professor R. V. BRADLAW, M.D.S., Dunelm, F.D.S., M.R.C.S. Eng.
Professor of Oral Pathology, Durham University
Director, Newcastle-upon-Tyne Dental School

Expert guidance on the many problems which confront the dentist

Demy 8vo 98 + viii Price 7s. 6d. net, plus 4d. postage

Hodder & Stoughton Ltd., 20, Warwick-square, London, E.C.4

MANAGEMENT OF BURNS

Six articles prepared by a subcommittee of the BRITISH ASSOCIATION OF PLASTIC SURGEONS
Reprinted from THE LANCET *with an appendix*

These articles record the practice of surgeons who are treating burns every day and who see the good results of treatment that is carefully planned from the start. Here is their plan, fully but briefly set out.

48 pages Price 2s. 6d. (postage 4d.)

The Lancet Limited, 7, Adam-street, Adelphi, London, W.C.2

New Books

PERIPHERAL VASCULAR DISORDERS

Edited by PETER MARTIN, V.R.D., M.Chir., F.R.C.S.Ed., R. B. LYNN, F.R.C.S., J. HENRY DIBLE, M.B., F.R.C.P., and IAN AIRD, Ch.M., F.R.C.S.

856 pages. 568 illustrations. £5 10s.

THIOPENTONE AND OTHER THIOBARBITURATES

By JOHN W. DUNDEE, M.D., F.F.A.R.C.S., D.A.

320 pages. 65 illustrations. 22s. 6d.

SIR WILLIAM ARBUTHNOT LANE

By T. B. LAYTON, D.S.O., M.S., F.R.C.S.

136 pages. 9 plates. 21s.

OUTLINE OF ORTHOPÆDICS

By J. CRAWFORD ADAMS, M.D., F.R.C.S.

432 pages. 347 illustrations. 32s. 6d.

BODY FLUIDS IN SURGERY

By A. W. WILKINSON, Ch.M., F.R.C.S.E.

222 pages. 7 illustrations. 16s.

THE PATHOLOGY AND SURGERY OF THE VEINS OF THE LOWER LIMB

By HAROLD DODD, Ch.M., F.R.C.S., and F. B. COCKETT, B.Sc., M.S., F.R.C.S.

470 pages. 511 illustrations. 65s.

E. & S. LIVINGSTONE LTD., Teviot Place, EDINBURGH

Gradual and sustained lowering of blood pressure

SEOMINAL is primarily indicated in mild or moderate degrees of hypertension. It induces a feeling of calmness and tranquillity without drowsiness, and relieves symptoms such as dyspnoea, congestive headache and vertigo. The hypotensive effect of Seominal is gradual, and may not be apparent for some weeks. The initial dosage is usually two tablets daily, later reduced to one or half a tablet daily.

Each tablet of Seominal contains 'Luminal' gr. 1/6, theobromine gr. 5, reserpine (alkaloid of rauwolfia) 0.2 mg.

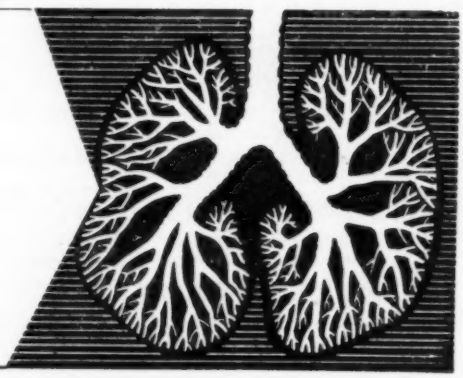
SEOMINAL

Trade Mark

BAYER PRODUCTS LIMITED

Neville House, Eden St., Kingston-on-Thames, Surrey
Export enquiries to: WINTHROP PRODUCTS LTD.

IMMEDIATE CONTROL OF ASTHMA



Before the underlying cause of asthma can be determined the physician invariably looks for an immediate measure for controlling the chief lesion BRONCHOSPASM. Complete reliance can be placed on FELSOL—prescribed for years by doctors for its immediate and sustained effect in relieving asthma attacks. Non-narcotic and non-cumulative, FELSOL is easy to take and gives full relief in perfect safety.

★ NO CONTRA-INDICATIONS
★ SAFE IN CARDIAC CASES

Clinical sample and literature on request

BRITISH FELSOL COMPANY LTD., 206/212, ST. JOHN STREET, LONDON, E.C.1

MAY 19, 1956 PAGES 701 TO 760

THE LANCET

A JOURNAL OF BRITISH AND FOREIGN MEDICINE, SURGERY, OBSTETRICS, PHYSIOLOGY, PATHOLOGY, PHARMACOLOGY, PUBLIC HEALTH, AND NEWS

No. 6925 LONDON: SATURDAY, MAY 19, 1956 CCLXX

CONTENTS

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT

ORIGINAL ARTICLES

On Diagnosing Cancer Histologically
W. WALLACE PARK, M.B.... 701

Urinary Excretion of Œstrogens During Pregnancy, Lactation, and the Re-establishment of Menstruation
J. B. BROWN, PH.D..... 704

Anæsthesia for Operative Obstetrics
D. J. COLEMAN, F.F.A. R.C.S.
B. L. DAY, F.F.A. R.C.S..... 708

A Specific Virus-antibody Flocculation Reaction with Poliomyelitis Viruses
Prof. WILSON SMITH, M.D., F.R.S.
F. W. SHEFFIELD, M.B.
L. H. LEE, M.B.
GILLIAN CHURCHER, M.B.... 710

Duration of Vasodilatation after Lumbar Sympathectomy
A. MCPHERSON, M.R.C.P.
A. W. L. KESSEL, F.R.C.S.... 713

Mixed Staphylococcal Infections
R. W. FAIRBROTHER, F.R.C.P. 716

Staphylococci Harboured by People in Western Highlands of New Guinea
PHYLLIS ROUNTREE, D.SC... 719

Effect of Vitamin-K Dosage on Plasma-Bilirubin Levels in Premature Infants
J. P BOUND, M.R.C.P.
T. P. TELFER, M.B..... 720

Bone-marrow in Ankylosing Spondylitis
E. M. KINGSLEY PILLERS, M.D.
JOHN MARKS, M.R.C.P..... 722

Oral Streptomycin in Bacillary Dysentery
GEORGE SANGSTER, M.D..... 723

Rapid Test for Hepatolenticular Degeneration
H. A. RAVIN, M.D..... 726

Vitamin-B_{12} Deficiency Due to Defective Diet
R. J. HARRISON, M.R.C.P.
C. C. BOOTH, M.R.C.P.
D. L. MOLLIN, M.B..... 727

REVIEWS

Notices of Books..... 730

LEADING ARTICLES

BURNS AND SCALDS..... 731
INFANTILE PYLORIC STENOSIS .. 732
THE MEDRESCO HEARING-AID... 733

ANNOTATIONS

Printing Dispute..... 734
Anæsthesia in Obstetrics..... 734
Brand-new Shambles..... 735
Lung Cancer in Young Persons.. 735
Semi-retirement..... 736
Poliomyelitis Flocculation Reaction..... 736

PRELIMINARY COMMUNICATION

Irradiation of Pituitary for Advanced Mammary Cancer
W. P. GREENING, F.R.C.S.... 728

NEW INVENTIONS

An Articulating Enterotome
A. GOUREVITCH, F.R.C.S..... 729

THE WIDER WORLD

Tuberculosis in Thailand
A. J. BENATT, M.D..... 737

CONFERENCES

Atlantic City Meetings..... 743

PERSONAL PAPERS

Eye-witness Among the Eugenists 744

SPECIAL ARTICLES

Iodine and Fluorine..... 745
Regional Hospital Boards and Boards of Governors of Teaching Hospitals..... 746

IN ENGLAND NOW

A Running Commentary by Peripatetic Correspondents... 747

LETTERS TO THE EDITOR

Smoking (Dr. W. H. McMenemey) 748
G.M.C. Election (Dr. R. A. Roberts; Dr. E. H. Markby).. 749
Basal Horizontal Lines on Chest Radiographs (Prof. J. Gough, M.D.; Dr. R. G. Grainger; Dr. J. H. E. Carmichael, Dr. D. G. Julian)..... 749
Treatment of Burns and Scalds.. 750
Cystic Pneumatosis (Mr. R. F. Read, F.R.C.S.)..... 750
Giant Hypertrophic Gastritis (Mr. W. D. Park, F.R.C.S.)..... 751
Resin-reinforced Plaster Casts (Mr. D. F. Thomas, F.R.C.S.) 751
Addiction to Methylated Spirit (Dr. M. M. Glatt)..... 751
Artificial Respiration (Dr. R. E. W. Fisher)..... 752
Closed Traumatic Lesions of the Axillary and Brachial Arteries (Dr. Jane Pearce)..... 752
Perforated Acute and Chronic Peptic Ulcer (Mr. V. J. Downie, F.R.C.S.E.)..... 752
Mepacrine for Petit Mal (Dr. Gordon Dutton)..... 752
Radcliffe Respiration Pumps (Dr. J. F. Galpine, Dr. Colm Brady) 753
Revision of the Curriculum (Dr. John Badenoch)..... 753
Home Confinement (Dr. Llywelyn Roberts)..... 753
Administration of Iron in Antenatal Clinics (Dr. R. O. Gillhespy)..... 753
Production of Codeine (Dr. E. P. Evans)..... 754
Carrageen (Dr. Seaghán Ua Conchubhair)..... 754
The Pattern of General Practice (Prof. Donald Court, F.R.C.P.).. 754
Research Defence Society..... 754
Daphne and the Greenfinches... 754

PUBLIC HEALTH

Contaminated Flour?..... 754
Help for the Family..... 754

OBITUARY

Sir Sheldon Dudley..... 755
Sir Cuthbert Sprawson..... 756
Robert Paul Scott Mason..... 756
Hyacinth Bernard Wenceslaus Morgan..... 757

NOTES AND NEWS

World Health Assembly..... 758
The Royal Society..... 758
The Desert and the Rose..... 758

Diary of the Week..... 757
Appointments..... 760

WILSON'S RADIUM THERAPY: Its Physical Aspects and Extensions with Radioactive Isotopes

by C. W. WILSON, M.Sc., Ph.D., F.Inst.P. Written by the Principal Physicist to the Westminster Hospital, this new second edition, besides dealing with radium and radon therapy incorporates recent knowledge of the clinical uses of radioactive isotopes in pathological conditions requiring beta and gamma radiation. Pp. 260 with 21 plates, 73 illustrations and 68 tables.
Postage 1s. 6d. **37s. 6d.** *net.*

BAILLIÈRE TINDALL AND COX

AMBROSE AND NEWBOLD'S A HANDBOOK OF MEDICAL HYPNOSIS

by GORDON AMBROSE, L.M.S.S.A., and GEORGE NEWBOLD, M.B., B.S., M.R.C.S., M.M.S.A., D.R.C.O.G., D.C.H. This handbook gives practical instruction and wise counsel on the use of hypnotherapy in general practice. Case histories, most of them followed up for several years, are given: legal aspects are carefully examined and the history of medical hypnosis is briefly told.
Pp. xiv+256. *Postage* 1s. 3d. **21s.** *net.*

7-8 HENRIETTA STREET, LONDON, W.C.2

"MIOTROL"-P
TRADE MARK

Tablets containing :—
Methyl Testosterone 2.5 mg. Ethinyl Oestradiol 0.005 mg. Phenobarbitone 16.0 mg. (¼ gr.)

A synergistic combination of androgen and oestrogen with phenobarbitone.

Specifically designed for control of symptoms associated with menopausal disturbances, premenstrual migraine and tension, dysmenorrhoea.

Literature forwarded on request.

AN OXOID PRODUCT

OXO LTD. (Medical Dept.)
THAMES HOUSE, LONDON, E.C.4
Telephone: CENtral 9781

MEDICAL RESEARCH COUNCIL

Peripheral Nerve Injuries

by THE NERVE INJURIES COMMITTEE OF THE MEDICAL RESEARCH COUNCIL

(*Editor :* H. J. SEDDON)

This extensively illustrated Report contains an account of experimental and clinical findings in an investigation of injuries affecting the nerve trunks of the limbs.

Special Report Series No. 282
55s. (post 1s. 5d.)
$9.90 (post 32c.)

HMSO

P.O. Box No. 569, London, S.E.1; Edinburgh; Manchester; Birmingham; Cardiff; Bristol; Belfast; or through any bookseller; and from British Information Services, 30 Rockefeller Plaza, New York, 20, U.S.A.

ADVERTISED AND INTRODUCED *ONLY* TO THE MEDICAL PROFESSION

BENGUE'S BALSAM

Menthol 20%, Methyl Salicylate 20% in Lanoline Excipient

ANALGESIC : DECONGESTIVE : RELAXANT

Easy of application and readily absorbed by the skin with deep penetration, Bengue's Balsam gives almost immediate relief from pain, promotes circulation of the blood in congested areas, and facilitates freedom of movement. Invaluable as external treatment in Rheumatism, Fibrositis, Torticollis, Lumbago, Muscular Fatigue, Myalgia, Sciatica, Neuralgia.

Tubes of ½ oz. and 1 oz. Dispensing Pack : 1 lb.
RETAIL PRICES : Small Size 2/2. Large Size 3/9.

BENGUE & CO., LTD.
Manufg. Chemists, MOUNT PLEASANT, ALPERTON, WEMBLEY, MIDDX.

H. K. LEWIS'S PUBLICATIONS

Just published. Third Edition. 8½ in. × 5½ in. **£3 10s. 0d.** net; postage 1s. 6d.

LAW RELATING TO HOSPITALS AND KINDRED INSTITUTIONS

By **S. R. SPELLER,** LL.B., of Lincoln's Inn, Barrister-at-Law. Secretary and Director of Education, Institute of Hospital Administrators.

INTRODUCTION TO GENERAL PRACTICE

By **D. CRADDOCK,** M.B., Ch.B., D.Obst.R.C.O.G. With a Foreword by Sir W. HENEAGE OGILVIE, *K.B.E.*, F.R.C.S. 8½ in. × 5½ in. **£2 2s. 0d.** net; postage 1s. 6d.

BIOCHEMICAL INVESTIGATIONS IN DIAGNOSIS AND TREATMENT

By **J. D. N. NABARRO,** M.D., M.R.C.P. With Illustrations. 8½ in. × 5½ in. **£1 5s. 0d.** net; postage 10d.

APPROVED LABORATORY TECHNIC

By **JOHN A. KOLMER,** M.D., D.P.H., Sc.D., **E. H. SPAULDING,** Ph.D., and **H. W. ROBINSON,** Ph.D. Fifth Edition. With 403 Illustrations and 28 Coloured Plates. 10 in. × 6¾ in. **£4 10s. 0d.** net.

THE ANATOMY OF THE EYE AND ORBIT

Including the central connections, development, and comparative anatomy of the visual apparatus

By **EUGENE WOLFF,** M.B., B.S.(Lond.), F.R.C.S.(Eng.). Fourth Edition. With 406 Illustrations (52 Coloured) in Plates and the Text. 10 in. × 7¼ in. **£3 5s. 0d.** net; postage 2s. 1d.

MENTAL HEALTH AND HUMAN RELATIONS IN INDUSTRY

Edited by **T. M. LING,** M.D., M.R.C.P., with the assistance of eight other contributors and with a Foreword by Lord HORDER, *G.C.V.O.*, M.D., F.R.C.P. With 10 Illustrations. 8½ in. × 5½ in. **£1 4s. 0d.** net; postage 1s. 6d.

THE CLINICAL EXAMINATION OF THE NERVOUS SYSTEM

By **G. H. MONRAD-KROHN,** M.D. (Oslo), F.R.C.P. (Lond.), M.R.C.S. (Eng.). Tenth Edition. With 165 Illustrations. 8½ in. × 5½ in. **£1 16s. 0d.** net; postage 1s. 6d.

TESTS FOR COLOUR-BLINDNESS

By **SHINOBU ISHIHARA,** M.D. Eleventh Edition, revised. With 38 Plates with instructions and key. **£3 15s. 0d.** net; postage 1s. 5d.

CLINICAL RADIOLOGY OF THE EAR, NOSE AND THROAT

By **ERIC SAMUEL,** M.D., F.R.C.S.(Eng.), F.F.R., D.M.R.E. With 320 Illustrations. 10 in. × 7½ in. **£3 10s. 0d.** net; postage 1s. 10d.

London: H. K. LEWIS & Co. Ltd., 136 Gower Street, W.C.1

Telegrams: "Publicavit, Westcent, London" **Telephone: EUSton 4282 (7 lines)**

Availability of Vitamins in Yeast

Deficiencies of single factors of the Vitamin B Group do not occur. Accordingly, even if a deficiency condition appears to result from the lack of an individual factor of the group and it is considered necessary to give intensive treatment with this factor, *the entire Vitamin B Complex should be administered concurrently.*

It is, however, extremely important, in view of suggestions in recent publications, that the vehicle selected as a source of the entire B Complex does not withhold its vitamin content from the patient.

Human experiments show that the rich, natural vitamin potency of Aluzyme is totally available to the human system.

● *Aluzyme is not advertised to the public and may be prescribed on* **form E.C.10.**

ALUZYME
The NON-AUTOLYSED YEAST
with completely available Vitamins

Have you had your free copy of "The Therapeutic and Nutritional Value of Brewers' Yeast"?
Professional Samples and Prices on request from:—

ALUZYME PRODUCTS
PARK ROYAL ROAD, LONDON, N.W.10.

ESŌBAN SL
Medicated Calamines

Of the highest quality, specially produced to the meticulous standard for therapeutic purposes, Esoban Calamine allows incorporation of individual dermatologist's specific medication into its elegant base giving maximum impregnation.

Advantages of Esoban Calamines include:

Freedom from the messiness of most skin medications, thereby ensuring their ready acceptance particularly by women patients. Esoban Medicated Calamines incorporate Ichthyol 2%, Coal Tar 2%, Iodochlorhydroxyquinoline 1%, or Benzamine Lactate 0.25%. Other individual specific therapeutic compounds may be dispensed in Esoban Calamine.

Available in 4-oz. bottles and Winchesters for Hospital use.

May be freely prescribed on Form E.C.10.

Booklet on unsaturated fatty acid therapy on request.

SOUTHON LABORATORIES LTD.
Upper Richmond Road, London, S.W.15.
Vandyke 4347

SUPPLEMENTING NATURE...

The combination of bile salts and pancreatic enzymes in FELOPAN stimulates normal peristalsis and readily relieves chronic constipation. The two forms of FELOPAN—with and without mild laxatives—provide the complete treatment for breaking the cathartic habit and correcting intestinal indigestion.

FELOPAN contains: Ext. Fel Bovini B.P.C. 1½ gr. Pancreatin B.P.C. ¼ gr. Excipients q.s. and is supplied in bottles of 100 ORANGE-coated tablets.

FELOPAN COMPOUND contains: Strychnine Hyd. B.P. 1/200 gr. Ext. Bellad. Sicc. B.P. 1/40 gr. Aloin B.P. 1/5 gr. Ext. Fel Bovini B.P.C. 1 gr. Pancreatin B.P.C. 3/10 gr. Phenolphthalein B.P. ¼ gr. Excipients q.s. and is supplied in bottles of 100 BLUE-coated tablets.

FELOPAN

a supplementary source of bile salts and pancreatic enzymes

Literature and clinical samples gladly supplied to the medical profession on request

COATES & COOPER LTD PYRAMID WORKS, WEST DRAYTON, MIDDX.

Reproduced by permission of the Trustees of the Wallace Collection

Restoration of Repose with

EQUANIL

(MEPROBAMATE)

an outstanding new drug to lessen tension, reduce irritability and restlessness, and to produce more restful sleep and generalized muscular relaxation.

Supplies:
Bottles of 20 and 250 x 400 mgm. tablets

Wyeth

The word 'Equanil' is a registered trade mark

JOHN WYETH & BROTHER LIMITED
Clifton House, Euston Road, London, N.W.1

for the menopausal syndrome

A NEW FAT-STORED ŒSTROGEN

TACE

TACE may change present-day concepts of œstrogen therapy, because while resembling stilbœstrol and hexœstrol chemically it differs clinically in these important respects :—

TACE is stored in body fat—its activity is gradually released in a manner closely resembling natural œstrogen secretion.

TACE is free from side effects. Nausea, vomiting and œstrogen withdrawal bleeding in the female and painful gynæcomastia in the male are not produced.

TACE has virtually no effect on the pituitary gland. Resistance does not develop on prolonged therapy — 'TACE' is therefore of particular value in the treatment of prostatic carcinoma where it will often continue to control the condition when resistance to other œstrogens has developed.

REFERENCES

The Storage of Estrogen in Human Fat after Estrogen Administration. *Amer. J. of Obstetrics & Gynecology* (1952) **63**: 1361.

A Fat-Soluble Estrogen—Use in the Treatment of Menopausal Distress. *Amer. J. of Obstetrics & Gynecology* (1954) **3**: 201.

Preliminary Experience in Treatment of the Menopause with Tace, a new Type of Estrogen. *Journal of Clinical Endocrinology and Metabolism* (1954) **14**: 272.

Management of the Menopause. Editorial, *J. Amer. med. Ass.* (1955) **158**: 566.

'TACE' is available in capsules each containing 12 mg. chlorotrianisene in bottles of 60 and 300 capsules. *Detailed literature is available on request.*

INDICATIONS

1. MENOPAUSAL SYNDROME 2. INHIBITION OF LACTATION 3. PROSTATIC CARCINOMA

Merrell

'TACE' brand chlorotrianisene is distributed in the United Kingdom and Eire by

RIKER LABORATORIES LTD., LOUGHBOROUGH, LEICS.

for the Wm. S. Merrell Co., London.

Relieving the bronchial tree in asthma

'ASMAC' TABLETS are formularized to provide symptomatic relief of the bronchial tree both during actual dyspnoeic attacks of bronchial asthma, and during remissions.

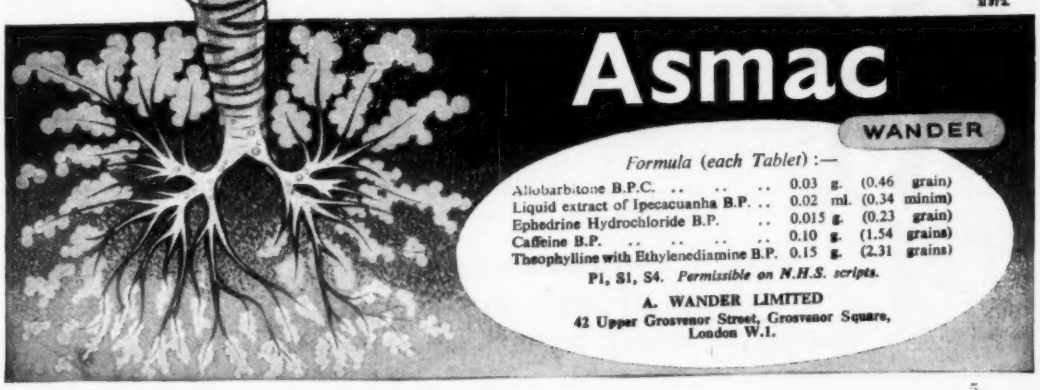
'Asmac' Tablets combine in a single prescription 'official' drugs recognized for their reliability to effect mental sedation, decongestion, expectoration and bronchodilatation.

Packs and Cost to Pharmacists :

Standard Tube of 20 : 3/-

Dispensing Bottles :
100, 12/- ; 500, 52/6 ;
1000, 102/6

M372.



Asmac

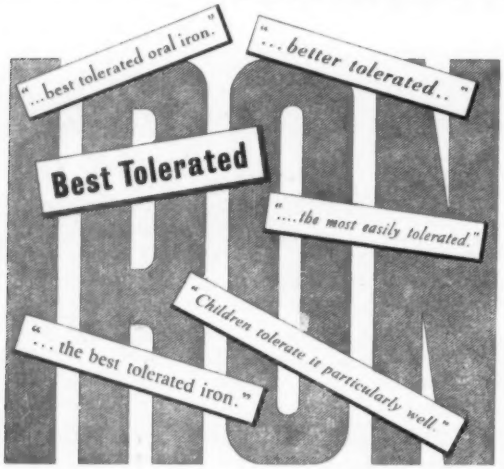
WANDER

Formula (each Tablet) :—

Allobarbitone B.P.C.	0.03 g.	(0.46 grain)
Liquid extract of Ipecacuanha B.P. ..	0.02 ml.	(0.34 minim)
Ephedrine Hydrochloride B.P. ..	0.015 g.	(0.23 grain)
Caffeine B.P.	0.10 g.	(1.54 grains)
Theophylline with Ethylenediamine B.P.	0.15 g.	(2.31 grains)

P1, S1, S4. *Permissible on N.H.S. scripts.*

A. WANDER LIMITED
42 Upper Grosvenor Street, Grosvenor Square, London W.1.



Patients readily express approval of this established haematinic because it is less likely than other iron preparations to provoke digestive upsets. Doctors, too, in ever growing number, prescribe Neo-Ferrum because its blandness means that patients with simple anaemia are more willing to follow treatment until their condition is resolved. Specially prepared for all iron-deficiency states, Neo-Ferrum combines rapid therapeutic effectiveness with palatability in both liquid and tablet form. It is economical in use, and may be prescribed with confidence for infants and children as well as adults.

NEO-FERRUM

Each teaspoonful (or 2 tablets) contains 0·4 g. (6 gr.) iron, equivalent to 2 g. (30 gr.) of iron and ammonium citrate.

BASIC N.H.S. COST:
Liquid .....6½*d. per fl. oz.*
Tablets .....1/5½ *for 25.*
Infants pack.....2/5 *per* ½ *oz. bottle (with pipette).*

THE CROOKES LABORATORIES PARK ROYAL LONDON NW10

Formula :
Quantity of Active ingredient in each Tablet

BOLDO	0.07	PODOPHYLLIN	0.002
EXT. BELLAD. SICC. B.P.	0.003	ICELAND MOSS	0.01
PHENOLPHTHALEIN ...	0.075		

Sole Distributors in Great Britain

W. FLETCHER (CHEMISTS) LTD.

5 RAMPAYNE STREET, LONDON, S.W.1 **Telephone: VICtoria 5555**

Furadantin★

BRAND OF NITROFURANTOIN

in urinary tract infections

Duncan

Furadantin is an antibacterial compound for the oral treatment of urinary tract infections only. Therapeutic concentrations up to 400 mcg./ml. appear in the urine but blood and tissue concentrations are very small. The drug is effective against most organisms found in the urinary tract, including *Proteus* and *Aerobacter*, and some strains of *Pseudomonas*.

Advantages

- Oral administration
- Broad antibacterial spectrum
- Action confined to urinary tract
- Only minor side-effects

Furadantin (brand of nitrofurantoin) is available as tablets of 50 mg. in bottles of 25 or 250.

Further information on the use of Furadantin, or Diagnostic Tablets for bacterial sensitivity tests, will be sent on request.

DUNCAN, FLOCKHART & CO., LTD.

104-8, Holyrood Road, EDINBURGH, 8

4, Carlos Place, LONDON, W.1

★ *Furadantin is manufactured by a registered user of the trade mark under licence from the Norwich Pharmacal Company (Eaton Laboratories Division).*

PANAR GRANULES

(PANCREATIN)

Keratin Coated or
Keratin Chocolate Coated

FOR THE TREATMENT OF FIBROCYSTIC DISEASE OF THE PANCREAS

Bottles of:
4 - 8 AND 16 OZ.

WRITE FOR LITERATURE TO:

THE ARMOUR LABORATORIES
(Armour & Company Ltd.)
HAMPDEN PARK, EASTBOURNE, SUSSEX
Telephone: Hampden Park 740 Telegrams: Armolab, Eastbourne

In non-specific and recurrent vaginitis . . .
Aci-jel
HIGHLY BUFFERED ACID VAGINAL JELLY (pH 4.0)
promptly
restores and maintains
vaginal acidity
Ortho
Ortho Pharmaceutical Limited
High Wycombe · England

Elastoplast Airstrip

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Waterproof yet non-occlusive, this new first-aid dressing PREVENTS MACERATION

Elastoplast Airstrip is made from a specially developed plastic material which is not perforated but consists of a microporous extensible filter. Sweat and skin exudates evaporate through this air-permeable dressing at the same rate as they develop on the skin. At the same time this new dressing is waterproof, preventing water, grease and oil from coming in contact with the wound.

Airstrip allows the wound to "breathe"; therefore maceration cannot develop. Because the surface of the wound and surrounding skin remain dry, the dressing can be left on until the wound heals—which it does under ideal dry conditions.

★ ★ ★

The air-permeable Elastoplast Airstrip dressing prevents development of maceration. Healing takes place in minimum time.

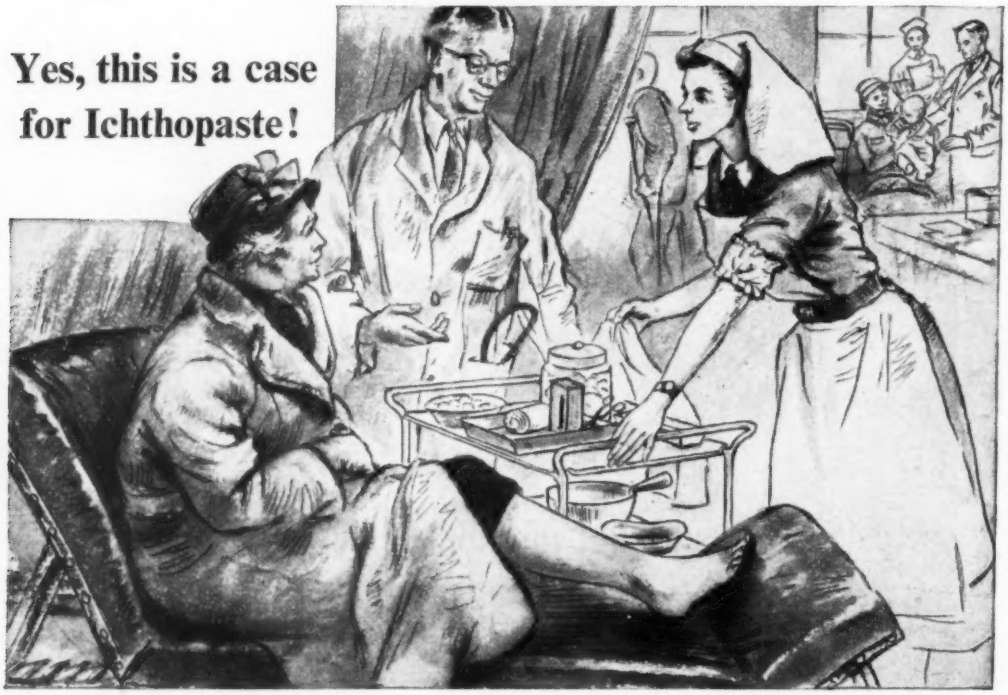
Doctors are invited to write for full details to:

SMITH & NEPHEW LTD.

WELWYN GARDEN CITY · HERTS

an S&N product

Yes, this is a case for Ichthopaste!



Ulceration of the leg with associated eczema . . . yes, this is a case for Ichthopaste! But this is only one of the complete range of Smith & Nephew paste bandages available (on E.C.10) to the Medical Profession. The paste content of these bandages is particularly high, being four times the weight of their fabric base.

Ichthopaste

ZINC PASTE AND ICHTHAMMOL BANDAGE B.P.C

This bandage contains 2% of Ichthammol. It is indicated for eczematous conditions associated with leg ulceration, particularly when the eczema is of the weeping type. The bandage never sets harder than its original spongy state which gives a resilient dressing. An Elastocrepe or Elastoplast bandage may be applied to give firm elastic support.

Viscopaste

ZINC PASTE BANDAGE B.P.C

A zinc paste bandage which requires no preliminary heating and is ready for immediate use on removal of the waterproof wrapper. Viscopaste sets quickly, forming a thin shell and is indicated for eczematous conditions and also as a support for the leg following the removal of P.O.P. casts.

COLTAPASTE

ZINC PASTE AND COAL TAR BANDAGE B.P.C

Made from light cotton fabric, evenly impregnated with a water miscible coal tar zinc oxide paste. Coltapaste is indicated for the dry, scaly, itching type of eczema associated with varicose conditions, infantile eczema and neurodermatoses. Here is an ideal medium for the application of prepared coal tar to the skin, wherever its use is indicated.

S&N **SMITH & NEPHEW LIMITED**

WELWYN GARDEN CITY · HERTS

The key to successful peptic ulcer treatment

NULACIN

Nulacin effectively controls gastric acidity. The value of Nulacin in the treatment of peptic ulcer and the prevention of relapse has been confirmed by clinical studies in Great Britain, Australia, the U.S.A. and India. Nulacin tablets are palatable and convenient.

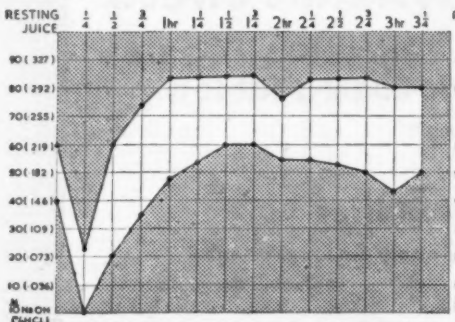
INDICATIONS

Nulacin tablets are indicated whenever neutralization of the gastric contents is required: in active and quiescent peptic ulcer, gastritis, gastric hyperacidity.

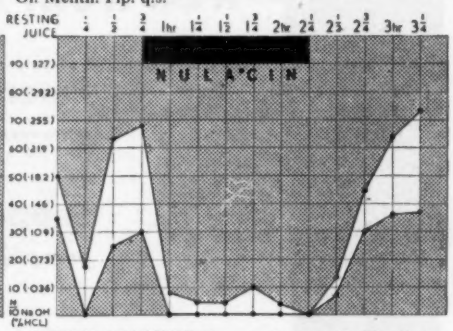
Beginning half an hour after food, a **Nulacin** tablet should be placed in the mouth and allowed to dissolve slowly. During the stage of ulcer activity, up to three tablets an hour may be required. For follow-up treatment, the suggested dosage is one or two tablets between meals.

Nulacin tablets are not advertised to the public, have no B.P. equivalent and may be prescribed on E.C.10. The dispensing pack of 25 tablets is free of Purchase Tax. (Price to pharmacists is 2/-.) Also available in tubes of 12.

Nulacin tablets are prepared from whole milk combined with dextrins and maltose, and incorporate Magnesium Trisilicate 3.5 grs.; Magnesium Oxide 2.0 grs.; Calcium Carbonate 2.0 grs.; Magnesium Carbonate 0.5 grs.; Ol. Menth. Pip. q.s.



GASTRIC ANALYSIS *Superimposed gruel fractional test-meal curves of five cases of duodenal ulcer.*



GASTRIC ANALYSIS *Same patients as in Fig. 1, two days later, showing the striking neutralizing effect of sucking Nulacin tablets (3 an hour). Note the return of acidity when Nulacin is discontinued.*

BIBLIOGRAPHY

The Control of Gastric Acidity, *Brit. Med. J.*, 26th July 1952, **2**: 180-182

Medical Treatment of Peptic Ulcer, *Med. Press*, 27th February, 1952, **227**: 195-199

Notes on Remedial Agents, *Med. Rev.*, Sept., 1952, **46**:162

Discussion on Peptic Ulceration, *Proc. Roy. Soc. Med.*, May, 1953, **46**: 354

The Effect on Gastric Acidity of "Nulacin" Tablets, *Med. J. Aust.*, 28th November, 1953, **2**: 823-824

Control of Gastric Acidity by a New Way of Antacid Administration, *J. Lab. Clin. Med.*, 1953, **42**: 955

Further Studies on the Reduction of Gastric Acidity, *Brit. Med. J.*, 23rd January, 1954, **1**: 183-184

Clinical Investigation into the Action of Antacids, *The Practitioner*, July, 1954, **173**: 46

Management of Peptic Ulceration in General Practice, *Med. World*, December, 1954, **81**: 591-601

Ambulatory Continuous Drip Method in the treatment of Peptic Ulcer, *Amer. J. Dig. Dis.*, March, 1955, **22**: 67-71

Notes on Remedial Agents, *Med. Rev.*, October, 1955, **49**: 142

Antacids in Peptic Ulcer, *The Practitioner*, January 1956, **176**: 103

Nulacin is available throughout the British Commonwealth, in the U.S.A., and many other countries. It is known as **Nulactin** in Canada and Sweden.

HORLICKS LIMITED
Pharmaceutical Division
Slough, Bucks.

A new compound

(4,4'-diacetoxy-diphenyl)-(pyridyl-2)-methane

Dulcolax

Regd. Trade Mark

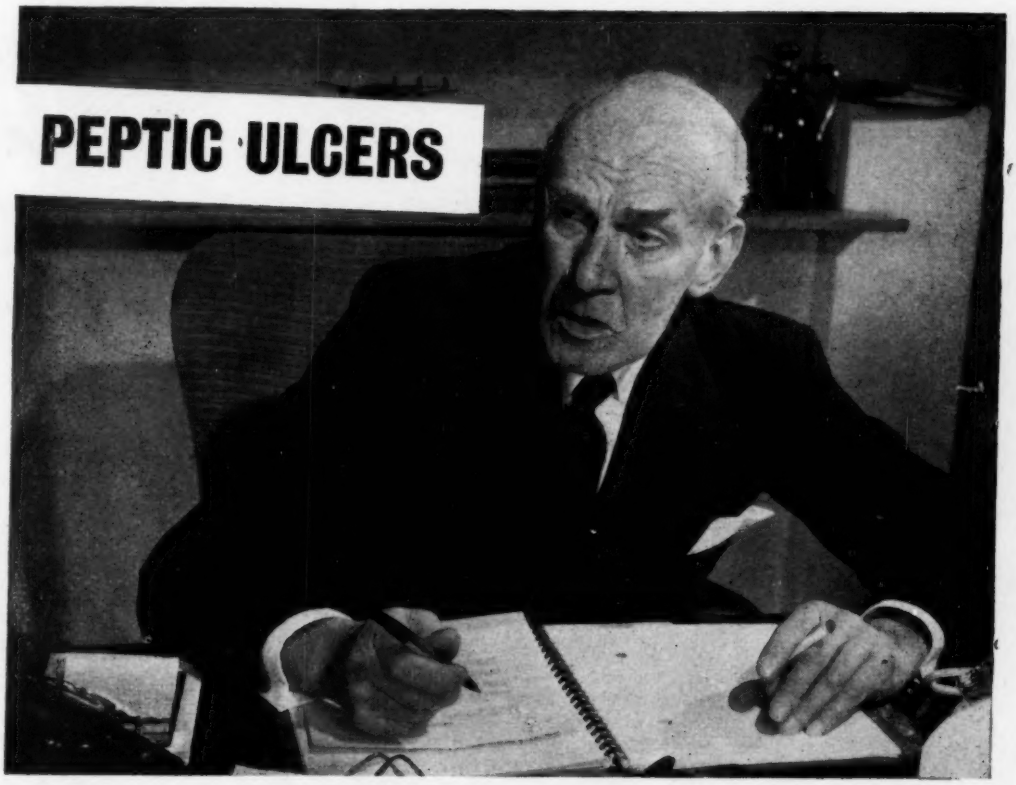
Contact Laxative free from systemic effects

Enteric Coated Tablets
act overnight

Suppositories
promptly empty the lower bowel replacing the enema

Supplied
Tablets (enteric coated) of 0.005 g.
Bottles of 30 and 200
Suppositories of 0.01 g. Boxes of 6 and 50

LEWIS LABORATORIES LTD., LEEDS 9



Pursuing his normal (pH) business

Benjamin McDougall, Esq., is a typical hard-pressed businessman. Year after year he carries a heavy burden of worrying responsibility. Peptic ulcers trouble him at intervals and the threat of them is always present.

A clear case for ALUPHOS TABLETS Aluphos Tablets, alone of common antacids, buffer the gastric secretion to pH 2.0—2.5—a normal value at which peptic digestion is not inhibited.

As a buffer, Aluphos Tablets act quickly and remain effective for several hours. Aluphos Tablets cannot cause 'acid rebound' and there is no risk of alkalosis. They are non-constipating. Mr. McDougall will appreciate Aluphos Tablets because they are palatable, portable and efficient.

Aluphos Tablets are economical—the basic N.H.S. price is 2/7d. per box of 50 tablets.

A clear case for ALUPHOS TABLETS

BENGER LABORATORIES LIMITED · HOLMES CHAPEL · CHESHIRE

A BENGER PRODUCT

Something Lacking . . .

The practitioner frequently encounters circumstances when that "something" is likely to be the vitamin B-complex. Administration of antibiotics, acute infections, surgery of the alimentary tract are particularly associated with impaired absorption or utilisation of these essential factors, with resultant insufficiency.

Initial intensive therapy (oral or parenteral) is provided by Becovite, with subsequent maintenance by Befortiss.

For intensive therapy **BECOVITE B Complex**
Tablets, 2 ml. Ampoules (Boxes of 3 pairs) Elixir (6 fl. oz.)

For maintenance therapy **BEFORTISS B Complex**
Tablets, 1 ml. Ampoules (Boxes of 5) Elixir (6 fl. oz.)

FULL DETAILS OF PACKS AND PRICES ON REQUEST. ALL PRESCRIBABLE ON THE N.H.S.

VITAMINS LIMITED (DEPT. B.3) UPPER MALL, LONDON, W.6

PARENTROVITE *for Neuroses & Psychoses.*

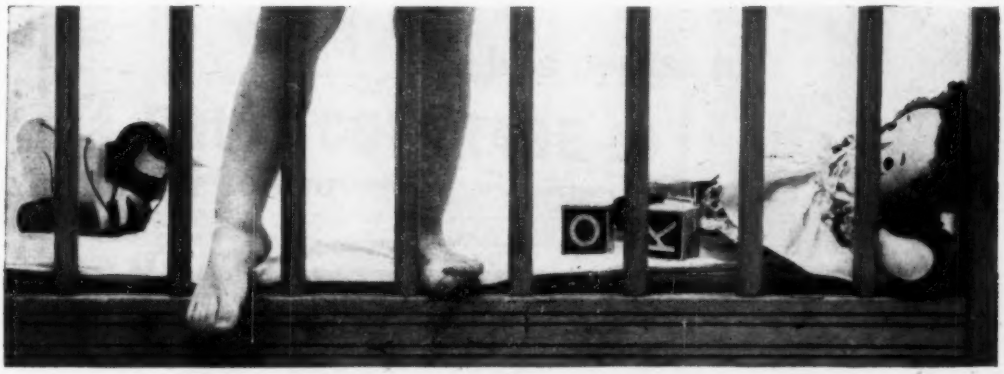
An injectable preparation of B vitamins and vitamin C in high concentration.

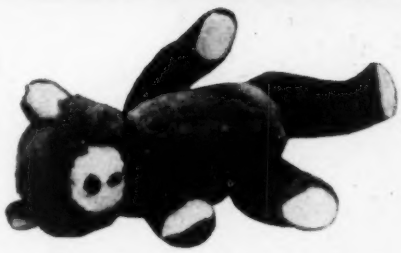
In Boxes of 3 pairs of ampoules. Hospital Packs also available.

OMNIVITE FORTE *for Oral use.*

Tablets containing all the vitamins needed to restore deranged metabolic processes.

In packs of 100 tablets.





IN CHILDREN....

THE 'ESKACILLIN' RANGE

of palatable LIQUID oral penicillins

The 'Eskacillins' are particularly acceptable to children. When a sore throat makes it difficult for the child to swallow tablets or capsules, the liquid form is easy to take; if he is petulant and unco-operative the carefully balanced flavour eliminates nose-holding and gagging, which may dissuade parents from giving correct dosage.

ESKACILLIN | 100 200 300

palatability—flexibility of dosage—rapid action

SMITH KLINE & FRENCH
represented by Menley & James, Limited, London

ECP36

in season and

out of season

"For the length of your rod, you are always to be governed by the breadth of the river you shall choose to angle at."
ISAAC WALTON—The Compleat Angler.

The doctor in general practice has not always such a well-defined guide when choosing the best drug with which to combat an infection. By prescribing 'Sulphamezathine' and penicillin together, however, as 'SULMEZIL', the maximum chance of a successful recovery is ensured.

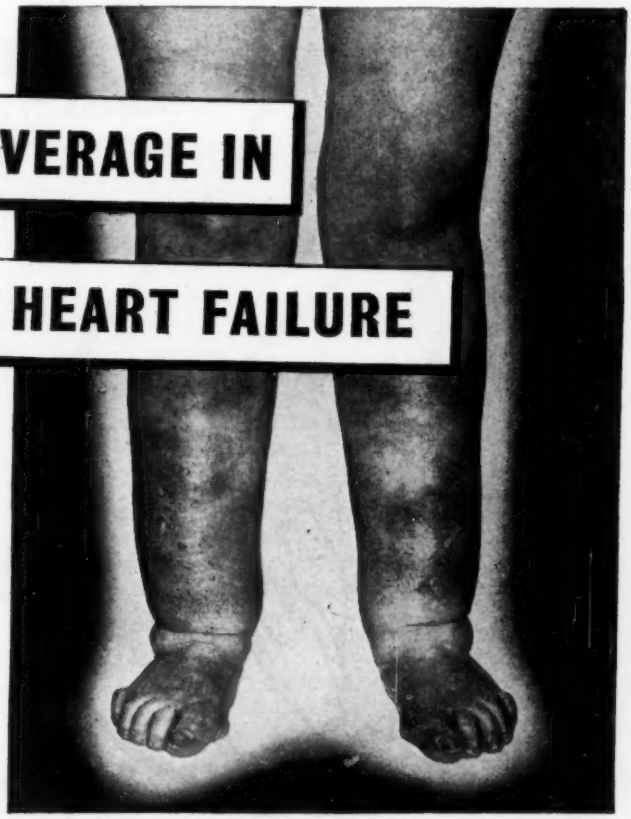
'SULMEZIL' *COMBINED 'SULPHAMEZATHINE' AND PENICILLIN THERAPY*

ORAL SUSPENSION AND TABLETS

IMPERIAL CHEMICAL (PHARMACEUTICALS) LIMITED, WILMSLOW, CHESHIRE
Ph.629 *A subsidiary company of Imperial Chemical Industries Limited*

16

4-POINT COVERAGE IN CONGESTIVE HEART FAILURE



Cheyne-Stokes Respiration

Cardiac failure

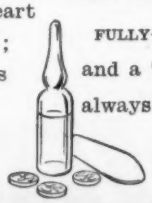
Bronchospasm

Oedema

A CLEAR CASE FOR CARDOPHYLIN. Best known and most widely used of the purine derivatives, Cardophylin is the one drug which combines *four* methods of treating heart failure. It is a respiratory stimulant; it controls bronchospasm; increases coronary flow; and it is a diuretic.

IT IS PRESENTED in tablets, suppositories, and ampoules for intravenous and intramuscular administration.

FULLY-DESCRIPTIVE literature is available and a Technical Information Service is always at your disposal.



A clear case for **Cardophylin**
THEOPHYLLINE—ETHYLENE—DIAMINE Trade Mark

(C.4 Rev. 1)

Manufactured by WHIFFEN & SONS LIMITED *and distributed by*

BENGER LABORATORIES LTD · HOLMES CHAPEL · CHESHIRE

BENGER

VISTER

VISMARA TERAPEUTICI

CASATENOVO (COMO) ITALY

evidence collected over two years has confirmed the value of

antemovis

anti-haemorrhagic factor of platelets

in controlling bleeding in medical and surgical conditions

available in boxes of 5 ampoules of 5 mg of double sulphate of 5-hydroxytryptamine and creatinine

for intravenous, intramuscular, topical use

Literature on request

NEW approach in

SKIN DISEASE

Inflammation with Infection

DEMANDS

'HYDROCORTONE' AND ANTIBIOTICS

'HYDRODERM' provides the anti-inflammatory steroid hydrocortisone, incorporated in an emollient base with the antibiotics neomycin and bacitracin. Specific activity is provided against both inflammation and infection. Use of these two broad-spectrum antibiotics assures protection from a wide variety of organisms commonly found in skin lesions. Neither neomycin nor bacitracin is likely to cause a local reaction, and their use does not contra-indicate the concurrent use of other antibiotics systemically. Topical Ointment of 'HYDRODERM' is supplied in tubes of 5 G. and 15 G.

Indications

Atopic dermatoses	**Contact dermatoses**
Allergic eczema	Allergic reactions due to:
Infantile eczema	Drugs
Eczematoid dermatitis	Cosmetics
Food eczema	Chemicals
Pruritus with lichenification	Soaps
	Plants
	Clothing

Non-specific anogenital pruritus

The NEW formulation

'HYDRODERM'

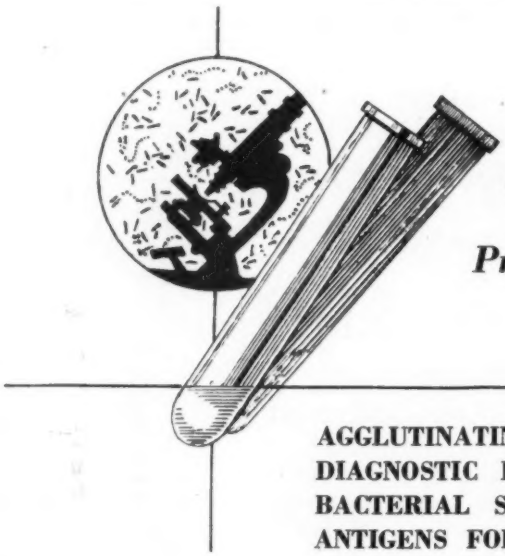
Trade Mark

TOPICAL OINTMENT

(Hydrocortisone - Neomycin Sulphate - Zinc Bacitracin)

Literature and professional package available to physicians on request.

MERCK - SHARP & DOHME LIMITED, HODDESDON, HERTS.



Sclavo

Products for laboratory use

AGGLUTINATING AND PRECIPITATING SERA DIAGNOSTIC EMULSION - CULTURE MEDIA BACTERIAL STRAINS - ENTIRE RANGE OF ANTIGENS FOR THE DIAGNOSIS OF SYPHILIS

New Sclavo Diagnostic Agents:

MACLAGAN TEST "SCLAVO" **HANGER TEST "SCLAVO"** **KUNKEL TEST "SCLAVO"**	Modified Colloidal Lability reagents (liver disorders, etc.).
TURBIDITY STANDARDS	For reading all turbidity reactions as well as turbidometric measurement of the proteins in the body fluids according to Kinsbury.
O-STREPTOLISINA "SCLAVO"	For the Antistreptolytic titration of serum in the diagnosis of diseases caused by B-hæmolytic streptococci.
STAPHYLOCOCCUS ALFA TOXIN "SCLAVO"	For titration of Staphylococcus antitoxin in the blood serum.
RING TEST "SCLAVO"	Antigen for the "Ring reaction" in milk for detecting animals that are carriers of Brucella (Br. melitensis, Br. abortus).

ISTITUTO SIEROTERAPICO E VACCINOGENO TOSCANO "SCLAVO" — SIENA, Italia

Direttore: Prof. Dott. Domenico d'Antona

Penidural

'Reliably absorbed in 100% of patients'

Brit. med. J., (1953) i. 805

Stable in gastric juice

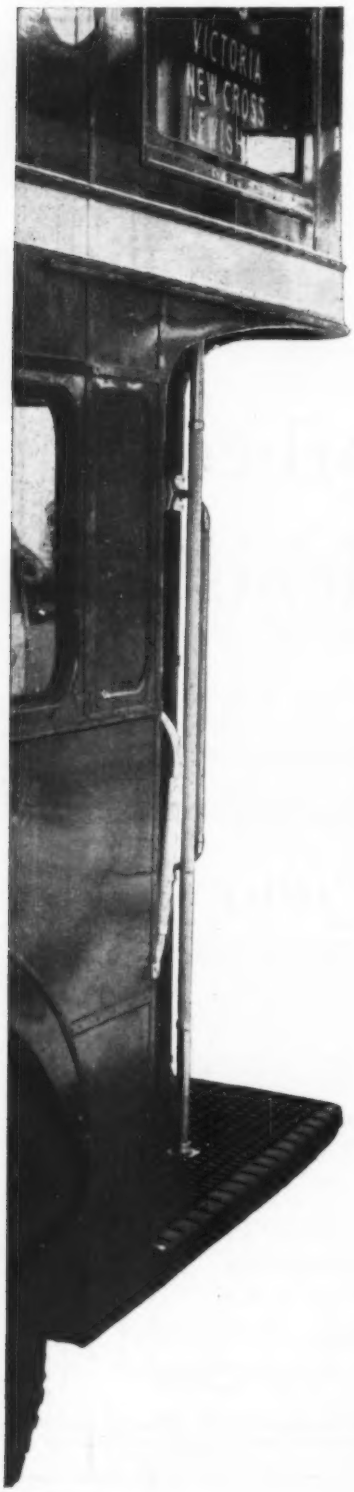
Penidural

Each 5 c.c. teaspoonful contains 300,000 units N.N¹-dibenzylethylenediamine dipenicillin G.

Wyeth

JOHN WYETH & BROTHER LIMITED

CLIFTON HOUSE, EUSTON ROAD, LONDON, N.W.1



reducing the risk of reducing...

PRELUDIN

brand of 2 - phenyl - 3 - methyl - tetrahydro - 1, 4 - oxazine - hydrochloride

PRELUDIN — the appetite controlling agent that does not raise the blood pressure

PRELUDIN, because it has no significant effect on the circulatory system, is the safest possible appetite-reducing treatment for *all* obese patients—particularly those with cardiovascular disorders or hypertension. Here, for the first time, is a powerful appetite-controlling agent that curbs the appetite, breaks the psychogenic overeating habit, and controls food intake without serious side effects. It enables the patient to lose weight safely and without mental strain by strengthening adherence to a prescribed diet. PRELUDIN does *not* create excessive mental stimulation. It is the prescription of choice in all cases of obesity—especially those with cardiovascular disorders—because it reduces the risk of reducing.

Preludin—the safe prescription for obesity

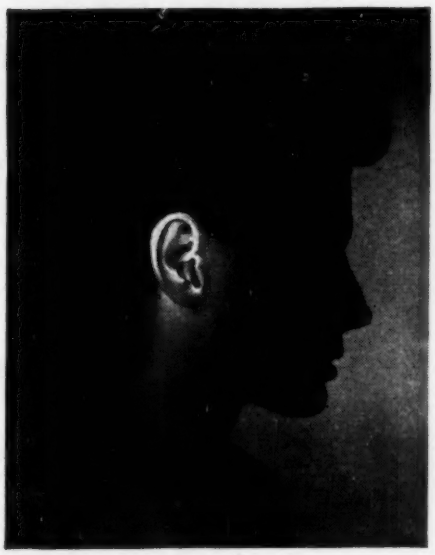
INGELHEIM

Manufactured and distributed in England by Pfizer Ltd., Folkestone, Kent, for
C. H. Boehringer Sohn, Ingelheim am Rhein
Registered proprietors of the trade mark.

* *Regd. Trade Mark*

EAR WAX

Removed this easy way



The removal of wax from the external auditory meatus has, in the past, normally entailed attendance by the patient for diagnosis and for the prescription of a suitable loosening agent, and a second attendance a few days later for syringing. Now, by the use of Cerumol Ear Drops, wax can be removed in most cases at one visit. A few drops of Cerumol can be instilled into the ear and, while another patient is being attended to, the soft cerumen dissolves and the harder wax disimpacts. The wax can then be removed by gentle syringing or with cotton wool. The wax may even be found to run out of the ear on its own accord, in which case patients themselves may instil Cerumol at home, obviating further attendances. Cerumol is anti-bacterial, non-irritating and harmless to the lining of the external auditory meatus or the tympanic membrane. Cerumol is included in Category No. 4 of the M.O.H. classified list and may be prescribed on N.H.S. Form E.C.10.

CERUMOL
Regd TRADE MARK

EAR DROPS

for the easier removal of wax

Distributors in U.K.
TAMPAX LIMITED, BELVUE ROAD, NORTHOLT, GREENFORD, MIDDLESEX. Telephone : WAXlow 2244

If you wish to test for yourself and have not received recently a 10 c.c. vial please write or telephone direct to :

LABORATORIES FOR APPLIED BIOLOGY LIMITED, 91, AMHURST PARK, LONDON, N.16 Telephone STAmford Hill 2252

PACKS for Surgery Use : 10 c.c. vial — separate dropper included. (Basic N.H.S. price 2/8.) *For Hospital Use : 2 oz. and 10 oz. bottles.*

Age is not measured in years

but in VITALITY

VITALITY is something to be coveted at any age, but during the later years this is especially so. Fitness in body and mind is the mainspring without which the elderly cannot enjoy the fullness that life has to offer. Such fitness and vitality in the later years is precisely the object of GEVRAL Geriatric Vitamin-Mineral Supplement. Devised specifically for those over forty, GEVRAL is a simple means of correcting the dietary deficiencies that so often arise during middle and later life. It is appropriate for those still working, and for those who seek a happy, healthy and active retirement.

Gevral*

*Regd. Trade-Mark

Geriatric Vitamin-Mineral Supplement

Each capsule contains:

Vitamin A	5,000 I.U.	Choline dihydrogen citrate	100 mg.	Iodine (as KI)	0·5 mg.
Vitamin D (viosterol)	500 I.U.	Inositol	50 mg.	Calcium (as $CaHPO_4$)	145 mg.
Vitamin B_{12}	1 microgram	Ascorbic Acid (C)	50 mg.	Phosphorus (as $CaHPO_4$)	110 mg.
Thiamine HCl (B_1)	5 mg.	Vitamin E	10 Units	Boron (as $Na_2B_4O_7.10H_2O$)	0·1 mg.
Riboflavine (B_2)	5 mg.	Rutin	25 mg.	Copper (as CuO)	1 mg.
Niacinamide	15 mg.	Purified intrinsic factor concentrate	0·5 mg.	Fluorine (as CaF_2)	0·1 mg.
Folic Acid	1 mg.	Iron (as $FeSO_4$)	10 mg.	Manganese (as MnO_2)	1 mg.
Pyridoxine HCl (B_6)	0·5 mg.	Zinc (as ZnO)	0·5 mg.	Magnesium (as MgO)	1 mg.
Calcium pantothenate	5 mg.			Potassium (as K_2SO_4)	5 mg.

50 Lederle FIFTIETH ANNIVERSARY

LEDERLE LABORATORIES DIVISION

Cyanamid PRODUCTS LTD. **LONDON W.C.2**

" No—there's a big difference, Mr. Baxter ... .

... as you will remember, in protamine zinc insulin, the action of the insulin is modified by the presence of a foreign protein, protamine. In contrast, I.Z.S. contains no protein or peptide material other than the insulin itself. That is its great advantage over other insulins. You see, gentlemen, the action of I.Z.S. persists for the required period by appropriate adjustment of the particle size of the insulin zinc compound. It is because the effect of I.Z.S. is entirely independent of any modifying protein, that allergic reactions following its use are virtually unknown. Any other questions ? "

I.Z.S. A.B. Vials of 10 c.c.
40 or 80 units per c.c.

I.Z.S. (Amorphous) A.B. Vials of 10 c.c.
40 or 80 units per c.c.

I.Z.S. (Crystalline) A.B. Vials of 10 c.c.
40 or 80 units per c.c.

Insulin Zinc Suspension A.B.

A B TRADE MARK

Joint Licensees and Manufacturers :

ALLEN & HANBURYS LTD LONDON E2 • THE BRITISH DRUG HOUSES LTD LONDON N1

EVANS MEDICAL

Pioneers of Anticoagulant Therapy

THE USE OF ANTICOAGULANT THERAPY in suitable cases is now firmly established. To avoid or to treat the dangers of cessation of flow of blood by thrombus or embolus formation, PULARIN (Heparin-Evans) and DINDEVAN (Phenindione-Evans) are unexcelled. For emergency use PULARIN is administered intravenously, and continuation of anticoagulant therapy ensured by subsequent administration of intramuscular Pularin or orally administered Dindevan.

Pularin—
1,000 I.U./ml. 5 ml. rubber-capped bottle
5,000 I.U./ml. 5 ml. rubber-capped bottle
25,000 I.U./ml. 5 ml. rubber-capped bottle
12,500 I.U./ml. 1 ml. ampoule

Dindevan—
Containers of 25 and 100 tablets

Further information on request from Medical Information Department, Speke, Liverpool, 19

182

EVANS MEDICAL SUPPLIES LIMITED · LIVERPOOL AND LONDON

Just a sip of water . . .

How patients dislike the huge draughts of water that must be taken with ordinary, less soluble sulphonamides. Yet, when Urolucosil is prescribed for B.coli infections of the urinary tract, fluids are unnecessary—even undesirable. For Urolucosil is highly soluble and very little is converted into the insoluble, inactive acetylated form. Excretion is rapid without the risk of crystalluria. The high urinary concentrations so quickly achieved make Urolucosil suitable for urinary tract infections —and yet permit minimal doses to be given. Thus side-effects are seldom observed.

ACTIVE PRINCIPLE: *Sulphamethizole 100 mg.*
DOSE: *1 tablet 4-hourly.*
PACKING: *In bottles of 25, 250 and 1,000 tablets.*
Urolucosil is a S.IV Poison, not subject to Purchase Tax.

UROLUCOSIL

WILLIAM R. WARNER & CO. LTD., POWER ROAD, LONDON, W.4.

3 essentials to sound clinical IRON replacement

In post-haemorrhagic states; as a therapeutic or precautionary measure during and after pregnancy; in adolescents, old people and those of unsound dietary habits, Ferraplex B is ideal for iron-deficiency anaemias of all kinds.

1 It contains adequate FERROUS iron in a form yielding rapidly increased and sustained haemoglobin levels.

2 The supplements it contains—copper, complete vitamin B complex, ascorbic acid—ensure that not only the additional iron but that present in the diet is fully utilised for haemopoiesis.

3 It is extremely well tolerated by patients of all ages, even those who usually react unfavourably to unmodified doses of iron salts.

COMPOSITION

The average daily dose of six FERRAPLEX B tablets contains:

FERRI SULPH. EXSICC., B.P. . . . . 1 gramme
COPPER CARBONATE . . . . . 2 mg.
ASCORBIC ACID (Vitamin C) . . . . . 50 mg.

NATURAL VITAMIN B COMPLEX EXTRACT: 2 grammes
prepared from brewers' yeast and including
Aneurine hydrochloride (Vitamin B_1) . . . 3 mg.
Riboflavine (Vitamin B_2) . . . . . 6 mg.
Nicotinamide . . . . . 30 mg.
and all the other naturally occurring factors of the vitamin B complex.

Bottles of 50 tablets: 5/3d (Retail); 250 tablets 15/6d (Basic N.H.S. price).

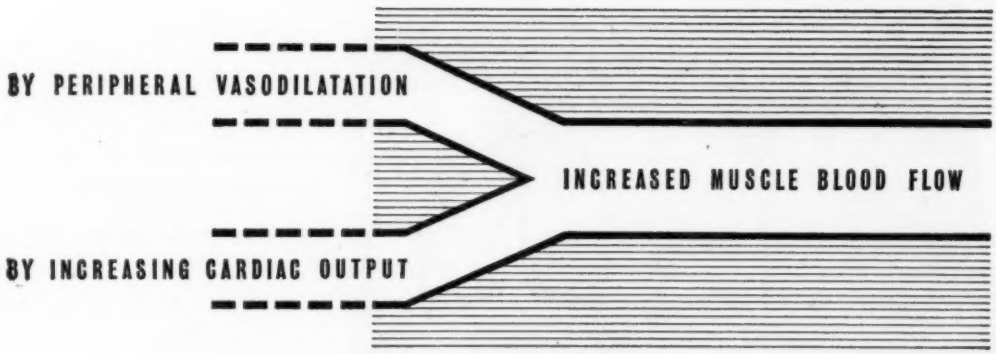
FERRAPLEX B

C. L. BENCARD LTD · PARK ROYAL · LONDON · N.W.10.

PERDILATAL*

TRADE MARK

increases muscle and skin blood flow in two ways



PERDILATAL has a two-fold action. It causes a dilatation of peripheral blood vessels, ensuring a preferential increase in muscle blood supply. At the same time the cardiac minute volume is increased; systolic pressure is maintained, diastolic pressure falls; mean arterial pressure is kept constant. This combination of vasodilatation and increased cardiac minute volume results in a considerable increase in muscle blood flow and a slight increase in cutaneous blood flow.

Indications : peripheral vascular disorders : intermittent claudication, arteriosclerosis; hypertension, rheumatic conditions.

Toxicity : low.

Dosage : Oral : 1 to 2 tablets, 4 to 6 times daily.
Parenteral : 1 to 3 ampoules daily may be administered.

Availability : tablets (2½ mg.) in containers of 100 and 500 ; ampoules (5 mg. in 1 ml.) in boxes of 12.

PERDILATAL was formerly known as DILATAL. *Full details from*

an S&N product

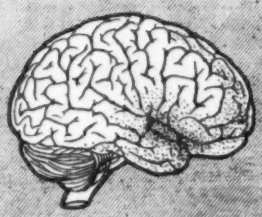
SMITH & NEPHEW LTD

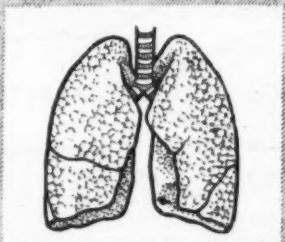
WELWYN GARDEN CITY · HERTS

* 1-(p-hydroxyphenyl)-2-(l'methyl-3'-phenyl-propylamino)-propanol-(1) hydrochloride.

Selective amine for asthma . . .

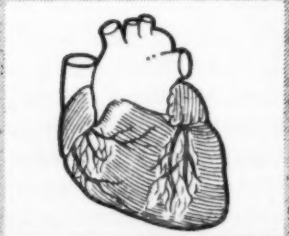
with only $\frac{1}{18}$ the central nervous system effect of ephedrine, Orthoxine avoids wakefulness and excitation, permits the asthmatic patient to rest and relax.





with twice the broncho-dilating effect of ephedrine, Orthoxine eases laboured respiration, provides more air for the asthmatic.

with only $\frac{1}{2000}$ the pressor effect of adrenaline, Orthoxine may be used even in elderly asthmatic patients and those with coexistent hypertension or cardiac disease.



ORTHOXINE*
HYDROCHLORIDE

DOSAGE:
Adults — $\frac{1}{2}$ to 1 tablet repeated, if required, every three or four hours. Children — fractional doses according to age.

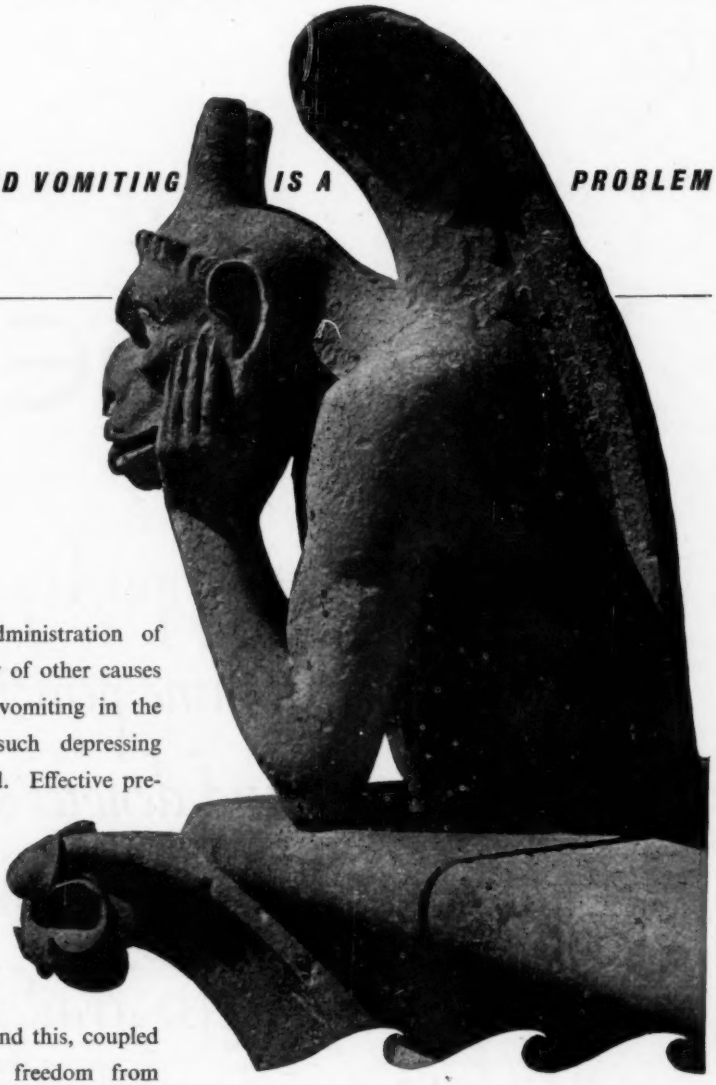
SUPPLIED:
Tablets of 100 mg. in bottles of 25 and 100.

* Regd. Trade Mark for the Upjohn brand of methoxyphenamine

Upjohn **Fine Pharmaceuticals since 1886**

UPJOHN OF ENGLAND LTD., 4 Aldford Street, Park Lane, London, W.1, England

WHEN NAUSEA AND VOMITING IS A PROBLEM



Travel, pregnancy, the administration of drugs — these and a variety of other causes may produce nausea and vomiting in the susceptible patient. But such depressing symptoms can be controlled. Effective prevention or relief can be obtained in a large proportion of patients using 'Avomine'.

'Avomine' is effective in small dosage. The drug has a long duration of action, and this, coupled with its low toxicity and freedom from side-effects, makes 'Avomine' a safe form of treatment, even for children.

'AVOMINE'
trade mark brand
PROMETHAZINE 8-CHLOROTHEOPHYLLINATE

THE GENERAL-PURPOSE ANTI-EMETIC

SUPPLIES
Containers of 10 and 250 x 25 mgm. tablets.

MANUFACTURED BY
MAY & BAKER LTD

An M&B brand MEDICAL PRODUCT MA2644

DISTRIBUTORS: PHARMACEUTICAL SPECIALITIES (MAY & BAKER) LTD · DAGENHAM · ESSEX

℞

'Solupen'

'Solupen' is our new quickly-written name for crystalline penicillin G sodium salt and denotes soluble penicillin of the highest purity and potency. Also available – 'Solupen' Buffered.

THE DISTILLERS COMPANY (*Biochemicals*) LIMITED

SPEKE, LIVERPOOL 19. *Tel:* HUNTS CROSS 1271

'Solupen' is a registered trade mark, the property of the manufacturers. PPH 6/56

RAUWILOID

a purified and biologically tested extract of . . . . RAUWOLFIA SERPENTINA

RAUWILOID is not the crude Rauwolfia root. Rauwiloid represents the total hypotensive activity of pure whole Rauwolfia serpentina root, freed from inert matter and the undesirable side-effects of the yohimbine type alkaloids.

RAUWILOID is not merely a single alkaloid of Rauwolfia. Rauwiloid provides the balanced action of the several potent alkaloids in Rauwolfia.

RAUWILOID contains besides reserpine other active alkaloids such as Rescinnamine* reported to be equally hypotensive but less sedative than reserpine.

RIKER

indications

Rauwiloid presents Rauwolfia in its optimal form for the treatment of essential hypertension. In severe, malignant cases its greatest value lies in its ability to ameliorate the side-effects of the more potent anti-hypertensives.

Dosage is simple—two tablets nightly.

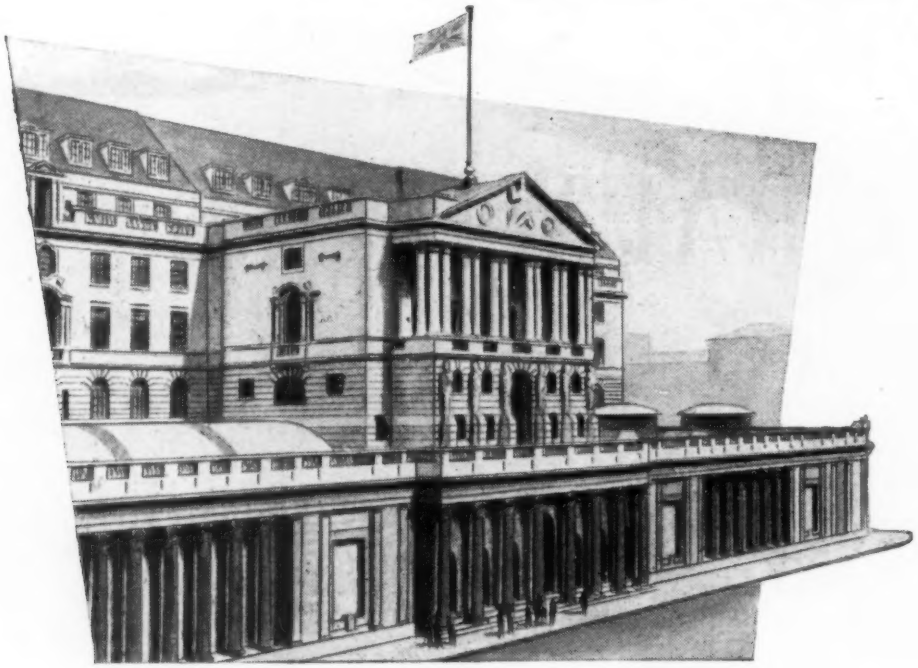
** References:*

Proc. Soc. exp. Biol., N.Y. (1954) 86: 120.
Amer. Chem. Soc. (1954) 76: 2843.

Detailed literature will be gladly sent on request.

'RAUWILOID' is a Registered Trade Mark. Regd. Users:

RIKER LABORATORIES LIMITED
LOUGHBOROUGH LEICS.



Symbol of security

The keynote in the success of ACHROMYCIN tetracycline is the genuine sense of *security* that its use engenders. More and more doctors look first to ACHROMYCIN—secure in the knowledge that it promises consistently superior results. Its range of antimicrobial activity is unsurpassed ; so, too, is its ability to diffuse swiftly throughout the body tissues. Moreover, ACHROMYCIN is available in an unusually wide variety of prescribing forms and is quick to gain the acceptance and confidence of patients of all ages.

ACHROMYCIN*

TETRACYCLINE

today's true broad-spectrum antibiotic

Available in the following forms:

CAPSULES · EAR SOLUTION · INTRAMUSCULAR · INTRAVENOUS · OINTMENT · OPHTHALMIC OINTMENT OPHTHALMIC POWDER STERILIZED · ORAL SUSPENSION PEDIATRIC DROPS · SOLUBLE TABLETS · SPERSOIDS* Dispersible Powder · SYRUP · TABLETS · TROCHES

* Regd. Trade-Mark

ACHROMYCIN antibiotic

50 Lederle FIFTIETH ANNIVERSARY

LEDERLE LABORATORIES DIVISION

Cyanamid PRODUCTS LTD. LONDON, W.C.2.

Antihistamines for old and young

When the contents of Pandora's Box were released, Hope alone remained. To the patient of allergic diathesis, threatened by a veritable Pandora's Box of ills, the antihistamines 'Histantin' and 'Actidil' represent far more than hope.
For adults 'Histantin' is the product of choice, giving prolonged relief with a minimum of side-effects.
The new quick-acting antihistamine, 'Actidil', exerts its effect for about 12 hours and is also notable for low incidence of side-effects. 'Actidil' Elixir has been specially formulated and clinically tried for the treatment of allergic conditions in children.

'HISTANTIN', *50 mgm., is issued in bottles of 25, 100 and 500 at list prices (subject to usual discount) of 6/6, 24/6, 110/-.*

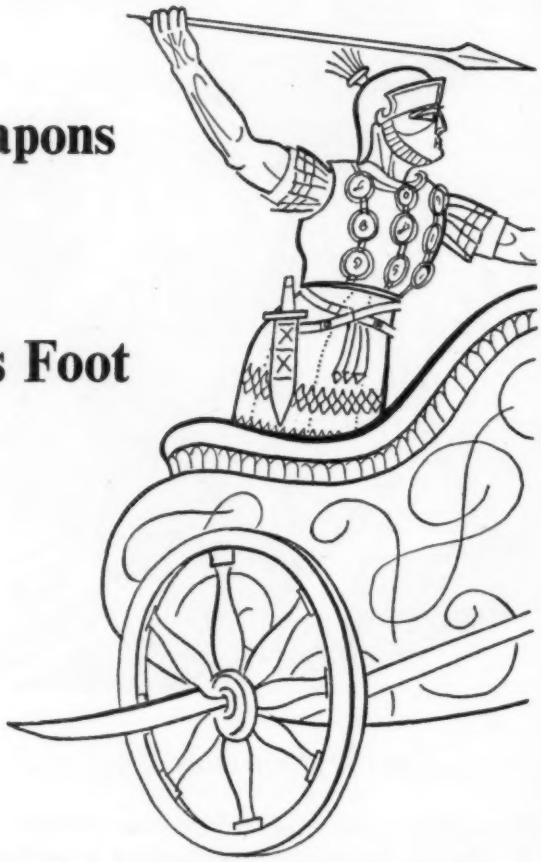
'ACTIDIL' *compressed products of 2·5 mgm. in bottles of 25 and 500 at list prices (subject) of 6/6 and 110/-.*

'ACTIDIL' ELIXIR *in bottles of 20 fluid ounces, for dispensing, at a list price (subject) of 15/-.*

BURROUGHS WELLCOME & CO. *(The Wellcome Foundation Ltd.)* **LONDON**

Two weapons against Athlete's Foot

and other fungal dermatoses



The combined use of Mycil Ointment and Powder has proved to be highly effective in both prophylaxis and treatment of fungal dermatoses.

Mycil Ointment is formulated to ensure penetration of the active constituent, chlorphenesin, to the site of the infection.

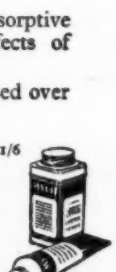
Mycil Powder, used alone, prevents reinfection. Because of its adsorptive properties it is a valuable agent with which to combat the effects of excessive perspiration.

Both preparations are non-mercurial and odourless and may be used over long periods, if necessary, without adverse effects.

'MYCIL'

TRADE MARK

MYCIL OINTMENT in collapsible metal tubes 1/6
MYCIL POWDER in sprinkler tins 1/6
Basic N.H.S. Prices



'MYCIL' Pessaries are available for treatment of trichomonal and fungal infections of the vagina. Tube of 12 3/-.

THE BRITISH DRUG HOUSES LTD. (Medical Department) LONDON N.1

MYC/M/551

ON DIAGNOSING CANCER HISTOLOGICALLY*

W. WALLACE PARK
M.B. Edin.
LECTURER IN PATHOLOGY, UNIVERSITY OF ST. ANDREWS

WHEN a pathologist makes a histological diagnosis of cancer he is doing two things. He is giving a prognosis for the patient concerned; and he is also influencing the treatment of future patients, for his dictum inevitably forms part of the body of knowledge from which the "facts" of incidence and curability of cancer will subsequently be deduced. For those who deal with the problem of cancer—surgeons, radiotherapists, statisticians, and others—it is clearly important that they should know just how closely histological diagnosis can approach absolute accuracy. The pathologist himself is none the worse for studying the factors that influence his judgment.

The pathologist giving a histological diagnosis of cancer is too often regarded as a dispenser of absolute truth. The wide use of, and faith in, the term "histologically proved" is evidence of this attitude. In fact, it is not possible to make an absolute diagnosis of cancer by microscopy in that the causal agent, whatever it be, cannot at present be seen in the lesion. The analogy with the histological diagnosis of tuberculosis or leprosy, where the causal agent can be seen, scarcely merits pressing here except as a contrast to the actual basis on which a histological diagnosis of cancer is founded.

Basis of Histological Diagnosis

A histological diagnosis of cancer is, in practice, founded on three sources of evidence: the gross specimen, the sections made from it, and the clinical data.

Macroscopic Evidence

The appearance of the gross specimen is never the final arbiter in a borderline case. It may, of course, raise suspicion, and, as has been said, "suspicion is the beginning of diagnosis." To the pathologist, and surgeon, of experience the naked-eye appearances usually indicate the zones that demand microscopic examination.

Microscopic Evidence

The important evidence lies in the sections, stained in whatever ways may be appropriate. As already mentioned, a causal agent cannot be seen. All we can use as evidence are alterations from the normal in cell structure and in tissue architecture. Diagnosis is then based upon an almost wholly empirical association—namely, the experience of pathologists in general has shown that such histological appearances are, in almost all cases, associated with increasing progression of the disease and shortening of the life of the untreated, and even of many treated, patients. In practice, of course, in straightforward cases the pathologist gives his outright diagnosis with confidence. He does not set out his argument along these lines; but that is his reasoning, and that is what he implies.

"*Clinical Cancer*" *and* "*Histological Cancer*"

We recognise a case as straightforward when the alterations in tissue pattern are obvious, and the correlation between these morphological alterations and subsequent death of a particular type is very high. Diagnostic difficulties become progressively greater, the lower this correlation is; and it is because the level of the correlation is so low at what we call the early stages of cancer that our diagnostic criteria at that stage are so poorly defined. The best we can do is, as it were, to extrapolate the lethal tissue patterns backwards and try to visualise them at an earlier stage. We do, however, use clinical correlations as long as we can. When we give a diagnosis of early cancer we do so because we feel that this kind of histological appearance has in the past, on some occasion, been correlated with progression of the disease. Diagnosis of cancer from the florid or straightforward case down to cases at this level is diagnosis of *clinical cancer*.

There is, however, another school of thought prepared to extrapolate tissue patterns even further backwards—in fact beyond the point where a significantly positive correlation with the subsequent manifestation of clinical cancer virtually disappears. This school argues that a histological pattern may be so atypical that only cancerous growth can explain it. This is the type of cancer we are told is present in the prostate of some 30–40% of men over the age of 50. Yet, nothing like 30–40% of men over the age of 50 die from prostatic cancer; so we can assume that cancer is being defined here in terms quite different from those used in defining clinical cancer. This is, in fact, *histological cancer*. There is, possibly, no harm in using the term "cancer of the prostate" to describe these appearances as long as this kind of cancer is not equated with clinical cancer, and as long as it is understood that when a man has had such an organ removed he has been cured, not necessarily of a lethal disease, but of a certain histological appearance within his prostate. Diagnoses made in this way, and such terms as "histologically malignant but clinically benign," require to be regarded with caution if cancer pathology is to be treated, as properly it should, as a science.

Histological "Criteria of Malignancy"

When we make the diagnosis of "cancer" at a low level of clinical correlation it is extremely difficult to know how close to the truth we are approaching, for the obvious reason that it is almost impossible to distinguish between *early* diagnosis and *wrong* diagnosis. If a lesion, diagnosed as cancer, but wrongly diagnosed in that it is not a cancer, is completely removed, the records will wrongly show that a cancer has been "cured." If, on the other hand, the histologist has a high, perhaps unjustifiably high, diagnostic threshold for cancer, a truly malignant lesion may be diagnosed as "not cancer," and the surgeon be cheated out of a genuine cure. The pathologist's difficulty is that he must try to visualise the earliest stages of those abnormal tissue patterns which, when at their maximum in the "obvious" case, form unmistakable evidence of atypical and excessive growth of cells. These patterns are manifest as (*a*) cell polymorphism accompanied by a varying degree of mitotic activity, and (*b*) the property which we call "invasiveness."

Neither of these properties can be depended upon absolutely. *Cell polymorphism* is abundantly seen, for example, in granulation tissue; and indeed the distinction between active granulation tissue and sarcoma can at times be perplexingly difficult, especially as mitotic figures may be seen in both. Polymorphism of cells is also prominent in many cases of Hashimoto's disease, so much so as to lead to an occasional wrong diagnosis of cancer: difficulty may also be increased here by the presence of mitotic figures in the hyperplastic tissue. Polymorphic growth is almost characteristic of proliferative trophoblast, such as is seen in some hydatidiform moles or even in simple placental polyps. These are specific instances, but the same difficulty arises more generally because of the polymorphism and mitotic activity so often seen in ulceration of epithelial surfaces. It is clear, therefore, that there are occasions in plenty when cell polymorphism and mitotic activity cannot be accepted as diagnostic criteria of malignancy.

Invasiveness.—This property of malignant growth becomes manifest sooner or later, but it is particularly

* Based on a lecture delivered at the U.S. Armed Forces Institute of Pathology, Washington, D.C., on Nov. 1, 1955.

difficult to identify in its earliest stage. Such terms as "invasiveness" and "invasion of the stroma" are thus difficult to define. To take one example: the histological characteristics of lymphosarcoma in its earliest stages are not at all sharply defined—hence the occasional use of the term "diffuse lymphocytoma" to describe the pattern of the lymph-node which has lost most of its normal architecture but whose constituent cells are not yet frankly malignant—but one of the criteria frequently accepted as indicative of malignant behaviour is "invasion (or transgression) of the capsule." In the advanced case transgression of the capsule is likely to be obvious, but if one looks for this in all surgically removed lymph-nodes one will see it remarkably often. This fact illustrates the circular argument into which we are so apt to fall when trying to lay down diagnostic criteria. The argument is that, since lymphosarcoma always shows capsular transgression, capsular transgression always indicates lymphosarcoma; whereas, in fact, it does not. There are also sites such as the thyroid and prostate where "invasion of the stroma" is commonly diagnosed, although in fact this diagnosis is rarely justifiable on the microscopic appearances alone. Indeed, if the epithelial elements still remain within the anatomical capsule of the thyroid or the prostate it is doubtful if the microscopist can rightly recognise invasion of the stroma at all.

We thus seek a finer criterion of invasion. Can it lie in "*rupture of the basement membrane*"? Nearly all epithelium has a basement membrane, and rupture of this membrane should, one would think, provide a fairly reliable criterion of malignant growth. Again, however, the histopathologist is disappointed. The exact nature of a basement membrane is still not known for certain, nor are the factors which may lead to its disappearance. It may certainly disappear, or at least become undemonstrable by ordinary staining techniques, in areas where there is chronic inflammation, as in chronic cervicitis or peptic ulceration—an unfortunate fact from the diagnostic point of view since it is so often the small, ulcerating lesion that causes diagnostic difficulty. In my own view, the integrity or otherwise of the basement membrane is of little or no value as a criterion of malignancy.

A final criterion is the presence of *neoplastic tissue within blood or lymph vessels*. Provided that both the vessel and the neoplastic tissue can be indubitably recognised, this criterion may certainly be of great value; but such a finding is unlikely in the early stages of a cancer.

Using the Clinical Data

All the criteria just discussed are purely histological and, difficult though they may be at times to define, they are the best criteria of malignant growth, short of metastasis, that we have. Ideally our recognition of "malignancy" in a section should be based on these purely histological criteria alone, and we should be able to answer the question "malignant or non-malignant?" or decide that it is unanswerable, by examining the section without knowing anything of the third source of information—the clinical data. With one possible exception—that of melanotic growths, where the significance of identical histological appearances possibly does vary with the age of the patient—a verdict of "malignant" or "not malignant" given on histological evidence alone should not be altered by any subsequent learning of the clinical data.

It may be objected that a proper and comprehensive opinion on a section cannot be given without full clinical data. This is indeed true; but the time for the histopathologist to read the clinical data is after he has assessed the section, not before. The almost invariable practice, when given a section, is to read or ask for the clinical data first, then to examine the section and give an opinion. This, in my view, is the least profitable and the least accurate way of assessing a section. Foreknowledge of the clinical data introduces into our mind a quite ineradicable bias—a bias such that some degree of prejudgment of the section is almost impossible to avoid. For example, if a histopathologist is given a section to examine, with the information that it was part of a paranephric mass, associated clinically with paroxysms of hypertension, he is quite unlikely, on finding a somewhat polymorphic slightly glanduliform neoplasm, to say other than that the mass was a phæochromocytoma. He may, of course, be correct; but, by learning the site and the clinical associations of the tissue he will have rendered himself virtually incapable of assessing the tissue pattern as a purely histological problem, or of recalling how closely such a growth may resemble a neoplasm of thyroid or parathyroid, or indeed an undifferentiated glandular carcinoma of almost any origin. If the same material be examined by a pathologist who, at the outset, intentionally ignores the clinical data, he is likely to argue thus: "This is part of a neoplasm whose pattern is not obviously diagnostic. If it comes from the region of the adrenal, phæochromocytoma is the likeliest diagnosis; if from around the carotid bifurcation, carotid-body tumour is the likeliest. If it comes from within or beneath the thyroid, a thyroid or parathyroid adenoma is possible [and he might prefer one rather than the other]. If an abdominal lymph-node is the source, secondary glandular carcinoma, of unidentifiable origin, is admissible." Then, and only then, having extracted the maximum information (and the maximum instruction) from the section, he turns to the clinical data and finally, on clinical grounds, narrows down his diagnosis to that one of his histological possibilities which now seems the most appropriate. He does this final part, however, by virtue not of his histological, but of his clinical, knowledge. Similarly, a neuroblastoma, a small-cell bronchial carcinoma, or a lymphosarcoma may be more rapidly diagnosed by the pathologist already in possession of clinical data; but, compared with his counterpart who has the habit of examining sections "blind," he will be so much the longer in learning the similarities commonly presented by these tumours. Not only is he slower to realise how relatively non-specific are many of the tissue patterns which we are apt to accept as diagnostic, but almost inevitably he is also slower to incorporate within his experience such fine differences of pattern as do in fact exist.

Now, it clearly matters little to the patient with a frankly malignant neoplasm whether the pattern of his neoplasm resembles that of another frankly malignant neoplasm or not. But there are other occasions when identity of histological pattern obviously does matter to the patient very much. These are the occasions when the lesion is of "borderline" appearance—occasions when we most need, yet most lack, sharp definition in our criteria of malignancy. Here again, the best hope of achieving increased sharpness and specificity in our criteria lies in increasingly frequent practice of "blind" examination of sections.

In illustration of this, an instance may be quoted where a histologist, having examined a section "blind," had decided that it showed part of a highly cellular, organising hæmatoma. The section itself gave no indication of the site, which was alongside a recently ruptured tendon. The section was then shown to two other histologists with the information that the material came from the region of a tendon, and both said, "probably a synoviosarcoma." In the circumstances this was a not unreasonable evaluation of a highly cellular tissue of polymorphic pattern containing clefts and spaces. Yet it is doubtful if this diagnosis would have been preferred had they not been biased at the outset by the mention of tendon.

The criteria for diagnosis of some examples at least of synoviosarcoma certainly lack specificity and sharp

definition. A similar state of affairs—many other examples could be given—is afforded by the section of endometrial curettings showing hyperplastic trophoblast, and the suspicion is chorionepithelioma. It is probably true to say that, given equally suspicious histological appearances, a preceding history of hydatidiform mole is more likely to lead to a diagnosis of malignancy than a history of abortion or normal pregnancy. Chorionepithelioma certainly does follow hydatidiform mole with disproportionate frequency, but this fact clearly cannot alter the histological characters in a section. If the histologist, knowing the clinical data, gives the graver prognosis he is doing so, once again, by virtue of his clinical, not his histological, knowledge.

The piece of clinical information which, known in advance, exceeds all others in warping one's histological judgment is knowledge of the patient's age. Foreknowledge of the sex is unlikely to cause bias in the diagnosis of malignancy—though it may delay the pathologist's own realisation of the close similarity shown by carcinomas of prostate and of ovary—but foreknowledge of the age of the patient can certainly do so. Few will deny that a borderline lesion—for example, a squamous-cell overgrowth of lip—is much more likely to be diagnosed as carcinoma at age 50 than at age 15. The reasoning behind this practice is that, since cancer of the lip (or other organ) is much commoner at age 50 than at age 15, a histologically borderline lesion at age 50 probably is cancerous but at age 15 probably is not cancerous. This reasoning is false, and based on a quite wrong use of probabilities. Cancer of the lip certainly is rare at age 15, but so are borderline appearances. The critical question is how often borderline appearances indicate malignancy irrespective of age. Largely because of lack of definition of what we call the borderline picture, there is as yet no exact answer to this question. The proper position at present is that if histological appearances are regarded as indicative of malignancy at age 50, then, unless we propose to adopt different criteria of malignancy for every age-group (and how many groups should there be?), the same histological appearances are equally indicative of malignancy at age 15 or at any other age. If the pathologist, already knowing the age of the patient, is confronted by a borderline lesion of this kind, we can be fairly sure that he is unlikely to make a diagnosis of malignancy in the patient of 15. The pathologist would like to believe that he is immune to such a biasing influence, but this in effect is what happens to a greater or lesser extent in every report where the age and other data are studied in advance.

The self-discipline involved in "blind" examining has the additional valuable humbling effect of making the histologist realise how helpless he can be without information about site, age, and other clinical details. Current practice is such that, on proffering a section to a colleague, we are hesitant even to ask whether he would like to have the clinical data before or after his examination. We shrink from the thought of being charged with sharp practice, and are fearful lest we make our colleague appear foolish in diagnosing, say, carcinoma of the prostate in a woman, or glioblastoma multiforme in a pelvic mass; though, such are the limitations of histological technique, and so non-specific many of our criteria, that such diagnoses, in so far as they are purely histological interpretations, might not be so foolish at all.

It is only by examining sections and making up our minds on the question of malignancy or non-malignancy on histological evidence alone that we can hope to appreciate exactly what the limitations of histological interpretation are; and gradually, by this appreciation, to define more sharply the criteria by which we diagnose malignancy. The value of this procedure depends ultimately, of course, on knowledge of the fate of the patients whose sections we have diagnosed, and for this we are mainly dependent on the good offices of our surgical and radiotherapeutic colleagues. Our current criteria of malignancy would probably be less hazy at the edges, and our standards of diagnosis of malignancy in marginal cases much higher, if follow-up departments had been initiated by departments of pathology forty or fifty years ago.

It is true that the habit of always examining sections "blind" at the outset adds a few minutes to the time required for reporting. To that extent it is a time-consuming practice. That it is a time-wasting practice is, I consider, emphatically not the case.

Everyday Diagnostic Problems

These observations have application to everyday diagnostic problems, particularly in view of the double purpose we achieve in giving a diagnosis of cancer—prognosis for the individual patient, and provision of data for later studies on cancer in general. In order to see briefly how these observations do apply, we may divide neoplasms into three main groups.

CASES WITH PREDICTABLE BEHAVIOUR

The largest group comprises the straightforward cases—cases where, as already mentioned, evidence of atypical cell behaviour is abundant, and the correlation of this with metastasis and a lethal outcome is high. Such cases may be "straightforward," but even here we may recall that diagnosis is not absolute. Our diagnosis, which is prognosis, is based, and for pragmatic reasons must be based, on the assumption that, in the absence of treatment, the lesion represented by the abnormal tissue pattern will progress and shorten life. In making this assumption we are not taking into account the fact that cancers vary greatly in their behaviour, not only in different organs but within the same organ. The recurrence of a cancer, locally or as a metastasis, ten years or more after its initial removal is well known and not infrequent. There is no method meanwhile whereby we can distinguish the original cancer of this type from any other in the same histogenetic family. A cancer which kills in six months may look quite similar to one which does not recur for ten years or more. Highly cellular cancers do, it is true, tend to grow more rapidly than less cellular ones, but all pathologists and surgeons are familiar with instances where a relatively poorly cellular densely scirrhous cancer, exhibiting, one would think, defensive fibrosis at its maximum, kills within a matter of months. Handicapped by this inability to distinguish cancers of different growth-rates, the pathologist can only give the same diagnosis, or prognosis, to each. The ways in which this variability of growth-rate and behaviour may influence cure-rates are obvious.

CASES WITH UNPREDICTABLE BEHAVIOUR

This group is formed of neoplasms whose histological characters give no dependable clues to future behaviour. Past experience has shown that, in this group, tissue with a benign future may look just the same as tissue with a malignant future. The pathologist can thus supply little more than the rather unhelpful information that such neoplasms sometimes metastasise: he cannot predict the probability of this with useful accuracy. This is not a large group, but it is, by its very nature, an interesting group histologically.

This peculiar difficulty—the lack of correlation between tissue patterns and likelihood of metastasis—arises in some forms of thyroid neoplasia. The extreme example would be the so-called benign metastasising goitre—a lesion which, to judge from reported cases, must be exceedingly rare nowadays. Some thyroid growths which are recognisably neoplastic but not obviously carcinoma do metastasise and kill; other

lesions of quite the same histological pattern, and present for the same length of time, do not. A granulosa-cell tumour which behaves as a carcinoma may be histologically indistinguishable from one that does not, and a similarly unpredictable future is associated with carcinoid tumours and with occasional melanotic growths. The fleshy, spindle-cell sarcomas, of whatever type, especially those in the subcutaneous region, form another tumour type whose future behaviour is far from predictable; some recur repeatedly and finally metastasise, others of apparently the same histological appearance do not. Retained placental tissue provides a good example of this kind of difficulty. Two excised uteri may show foci of persisting, hyperplastic trophoblast of apparently identical type; yet one patient will die of chorionepithelioma, and the other live. Quite similar tissue may be found in uterine curettings from patients who have no subsequent hysterectomy and yet survive. There is little difficulty in finding evidence of atypical cell growth in such retained trophoblast—the trophoblast may consist of little else but atypical cells—or in finding evidence of invasion, possibly on a grand scale. The histopathologist's problem is that there is no dependable correlation between these appearances and the later occurrence of metastases (Park and Lees 1950). The same lack of correlation applies in varying degree to the other neoplasms in this group, and for this reason accurate figures for incidence and curability are again extremely difficult to obtain.

"BORDERLINE" CASES

The third group of tumours comprises the so-called borderline cases—those cases where the surgeon wants an answer to the question, Has this growth crossed the borderline to malignancy? It is very likely that there is no such definite borderline, but the pathologist will remember that the surgeon nearly always has to act as if there were.

This borderline group is the main cause of worry in the diagnosis of biopsy material. When the pathologist uses the term "difficult" to describe these cases, he is not referring so much to purely histological difficulties (he can still recognise the various tissue components, and their arrangement) as to the lack of available knowledge of the clinical behaviour to be expected with such histological appearances—in other words, to a low level of clinical correlation. In these circumstances he cannot give his diagnosis with the same degree of confidence as in the straightforward group: nor can this be expected of him.

Here we find ourselves in conflict with scientific discipline. For *scientific* purposes, remembering our obligation to provide as accurate data as we can for cancer study as a whole, we should, if we feel the evidence in favour of a diagnosis of malignancy to be inadequate, say that a diagnosis of cancer cannot be given. For *practical* purposes, since the welfare of the patient is in the balance, the scientific outlook has to be put on one side, and a diagnosis of cancer made if there is even a moderate degree of suspicion of malignancy. The difference between diagnosis for these two purposes can be reconciled by making the reservation that though, in the interests of the patient, a diagnosis of cancer has to be made, the case very possibly was not one of cancer at all: in other words, to quote from an earlier discussion of this matter, "it is legitimate to treat a patient because he might have cancer but not legitimate always to assume that if he recovers he necessarily did have cancer" (Park and Lees 1955).

Summary and Conclusions

In all but clinically manifest cases, surgeons and radiotherapists are dependent for their diagnosis of cancer upon the pathologist. It is obvious, therefore, that if comparisons of different forms of treatment or of incidence of cancer are to be valid, the pathological diagnoses on which they depend must be accurate. It has been pointed out that, even under optimum conditions, histological assessment of malignancy is far from absolute. In the case of early cancer, histological criteria of diagnosis are even less satisfactory, and of lower practical value than pathologists would like. In such cases there may be quite legitimate differences in interpretation of the histology, and when this happens figures of incidence of early cancer will vary correspondingly.

The property of invasiveness, on whose presence or absence depends frequently the diagnosis of "malignant" or "not malignant," is particularly difficult to define, and therefore to recognise, in its early stages: indeed, in an attempt at its definition, I would go so far as to suggest, and not facetiously, that an abnormal overgrowth of cells should be regarded as showing invasion only if it shows what *every* histopathologist would say *was* invasion.

Pathologists should, by all means, persuade the clinician to provide them with as much in the way of clinical data as he can, informing him that, usually, the more help he gives them, the more they can give him. I would, however, suggest that the habit of always examining sections first, and reading the clinical data afterwards, is a valuable one. It should help to sharpen and clarify diagnostic criteria at that stage of cancer where we most need, yet most lack, sure definition—the early stage.

It has been shown that a diagnosis of cancer for practical purposes may at times, in borderline cases particularly, be inescapable; but that it is legitimate for scientific purposes to have reservations about the accuracy of such a diagnosis, and to take this fact into account in the retrospective analysis of data.

The term "histologically proved," when applied to cancer, is admissible only if "proved" is used in its original and now almost obsolete sense of "tried, tested, or assessed." Its equation with "proof" in the legal sense, with the implication that certain objectively defined, specific criteria have been satisfied, is not justifiable.

I am most grateful to Prof. A. C. Lendrum for helpful comments during preparation of the script for publication.

REFERENCES

Park, W. W., Lees, J. C. (1950) *Arch. Path. (Lab. Med.)* **49**, 73.
— — (1955) *Cancer*, **8**, 320.

URINARY EXCRETION OF ŒSTROGENS DURING PREGNANCY, LACTATION, AND THE RE-ESTABLISHMENT OF MENSTRUATION

J. B. BROWN
M.Sc. N.Z., Ph.D. Edin.
From the Clinical Endocrinology Research Unit (Medical Research Council), University of Edinburgh

FEW reliable figures are available for the urinary excretion of œstriol, œstrone, and œstradiol-17β during pregnancy and lactation. Most of the published figures for early pregnancy and lactation were for total œstrogens, and many were obtained by semi-quantitative bio-assay methods (Pedersen-Bjergaard and Pedersen-Bjergaard 1948, Venning 1948, Jayle and Crépy 1952). Cohen, Marrian, and Watson (1935), using colorimetry, were the first to determine the urinary excretion of œstrogens during the last 6 months of pregnancy: they showed that œstriol is quantitatively the most important urinary œstrogen during pregnancy, and that the amounts

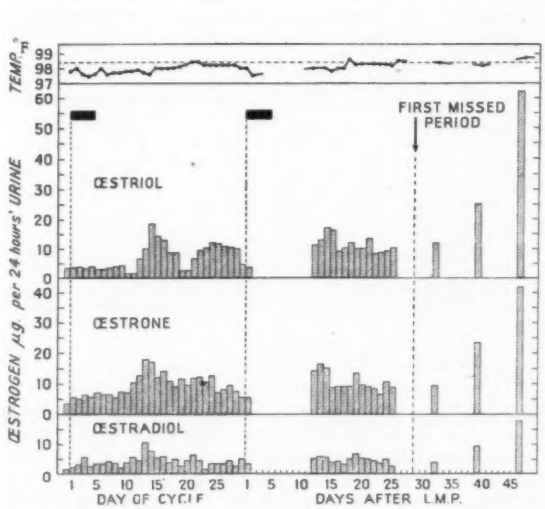


Fig. 1

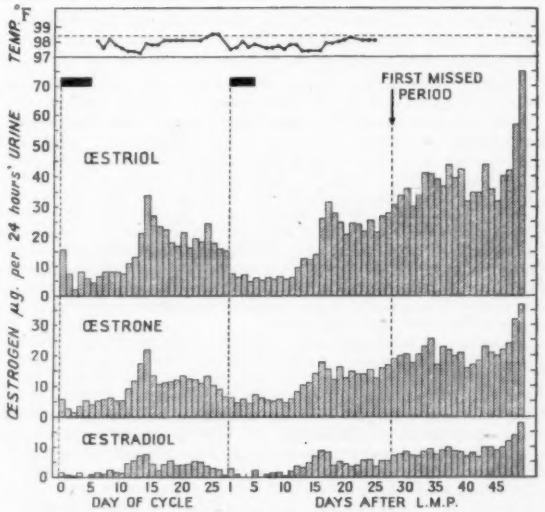


Fig. 2

■ Menstrual period.

Fig. 1 (subject 7) and fig 2 (subject 8) show the amounts of œstriol, œstrone, and œstradiol excreted per 24 hours and also the variations in basal temperature, during a normal cycle, the cycle in which pregnancy occurred, and early pregnancy.

excreted rise from approximately 1 mg. per day at 3 months (the smallest amount they could measure accurately) to 20 mg. or more per day at 9 months. Later workers (Venning 1948, Clayton and Marrian 1950, Bradshaw and Jessop 1953) confirmed these findings and provided more information about the type and amounts of œstrogens excreted immediately preceding labour and delivery.

Recently a convenient, accurate, and apparently specific chemical method * for separately estimating œstriol, œstrone, and œstradiol-17β in human urine has been developed (Brown 1955a).

Material

Using this method, a study has been made of the daily urinary œstrogen excretion of a woman from before the beginning of a normal pregnancy, up to delivery, and then during the puerperium, lactation, and the recommencement of normal menstruation. The subject of this complete study was a woman (subject 8) who had already contributed urine for œstrogen determination throughout a menstrual cycle (Brown 1955b). A similar but less complete record from another woman previously studied (subject 7) is also included, together with the results obtained from two other women who were studied from the 16th weeks of their pregnancies until the onset of labour.

In all cases, the previous and present pregnancies were uncomplicated. Deliveries were spontaneous except in subject 10 for whom forceps were required. Lactation was established in all cases.

Subject 7, aged 33 ; para-2 (2 and 6 years ago). Delivery 276 days after last menstrual period (L.M.P.). Baby's birth-weight 8 lb. 12 oz. (male).

Subject 8, aged 28 ; para-2 (2 and 3 years ago). Delivery 286 days after L.M.P. Baby's birth-weight 8 lb. $3^1/_4$oz. (male). Placental weight 1 lb. 11 oz.

Subject 9, aged 27 ; para-1 (2 years ago). Delivery 289 days after L.M.P. Baby's birth-weight 8 lb. 15 oz. (female). Placental weight 1 lb. 15 oz.

* The two œstrogens 16-epi-œstriol and the keto-œstrogen recently found in human pregnancy urine (Marrian and Bauld 1955, Watson and Marrian 1955), are not determined by this method nor do they interfere with the results.

Subject 10, aged 29 ; para-0. Delivery 287 days after L.M.P. Baby's birth-weight 9 lb. $3^1/_4$ oz. (male). Placental weight 1 lb. 12 oz.

Method

Complete 24-hour urine specimens were collected daily from subject 8 and approximately weekly from the others, until 2 weeks before the probable date of delivery, when daily collections were started. Subject 8 also collected all her urine during labour and delivery, 12-hourly for the next 4 days, and then daily until normal menstrual cycles were established.

The amounts of œstriol, œstrone, and œstradiol-17β in each specimen were determined by the method

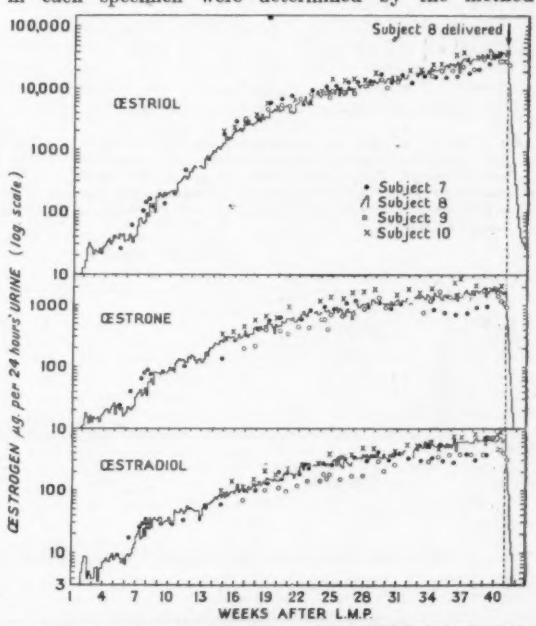


Fig. 3—Excretion of œstriol, œstrone, and œstradiol during pregnancy in the four subjects, and during the puerperium in subject 8.

described by Brown (1955a), modified, as follows, for urines containing larger amounts of œstrogens than could be satisfactorily measured by the original method.

The 24-hour urine volumes were diluted to 2500 ml. with water; according to the stage of pregnancy, 200, 100, 50, 20, or 10 ml. portions of this were used for each determination, and complete specimens of the œstriol fraction, or aliquots of $^1/_2$, $^1/_5$, or $^1/_{20}$ were taken for colour development so that the final œstriol, œstrone, and œstradiol-17β colours were within the convenient range for colorimetry. Specimens of urine of less than 100 ml. were diluted to 100 ml. with water before acid hydrolysis, and half the volumes of hydrochloric acid, ether, and carbonate solutions recommended in the original method were used. After the evaporation stage, the original procedure was unaltered; but if necessary, portions of the œstriol eluates from the chromatogram columns were taken for colour development.

The loss of œstrogens during acid hydrolysis (Brown 1955a) is less evident when the urine is dilute than when it is concentrated, and is negligible in late pregnancy when the urine is diluted five times or more before hydrolysis. To show that the method used in this investigation is reliable at the œstrogen levels encountered in late pregnancy, recovery experiments were performed in which 200 μg. of œstriol, 20 μg. of œstrone, and 10 μg. of œstradiol-17β were added to 10 ml. of male urine diluted to 100 ml. with water *before* acid hydrolysis: these amounts are equivalent to daily excretions of 50 mg. of œstriol, 5 mg. of œstrone, and 2·5 mg. of œstradiol-17β. In twelve such experiments, the mean percentage recoveries with their standard deviations were œstriol, 81±3; œstrone, 83±1·4; and œstradiol, 81±4—which are within the ranges claimed for the method.

Results

The results obtained from subjects 7 and 8 over a period which includes a complete menstrual cycle and the cycle in which pregnancy started are shown in figs. 1 and 2. In both women the urinary œstrogen levels were very similar in the two cycles up to about the 24th days—showing the ovulation peaks and the subsequent luteal rise. In the first cycle the œstrogen levels then decreased before the onset of menstruation; but in the second cycle, when pregnancy had occurred, they continued to increase, and they began to increase rapidly about 7 weeks after the last menstrual period. Subject 7 had nausea at this time.

The results from the four subjects throughout their pregnancies are shown in fig. 3 on a logarithmic scale. Those for subject 8 are also shown for a week after delivery. There was a rapid rise in the urinary levels of the three œstrogens throughout pregnancy, greatest between the 6th and 20th weeks. The œstrone and œstradiol levels at labour were 100 times higher than those during the luteal phase of the menstrual cycle, the œstradiol levels being about one-third of the œstrone levels. The urinary œstriol levels rose approximately 1000-fold during this time. The results obtained during the last weeks of pregnancy are shown in more detail in the accompanying table.

EXCRETION OF ŒSTRIOL, ŒSTRONE, AND ŒSTRADIOL-17β DURING LATE PREGNANCY EXPRESSED AS MG. PER 24-HOUR SPECIMENS OF URINE

Subject	Type of œstrogen	Weeks before delivery			Days before delivery						
		4	3	2	7	6	5	4	3	2	1
7	Œstriol	16	17	19	22	..	..	..	..	..	26
	Œstrone	0·75	0·70	0·75	0·93	..	..	..	..	..	0·95
	Œstradiol	0·30	0·28	0·40	0·38	..	..	..	..	..	0·38
8	Œstriol	31	31	39	35	35	36	41	40	36	41
	Œstrone	1·5	1·5	1·7	1·6	1·5	1·5	1·7	1·7	1·5	1·7
	Œstradiol	0·60	0·58	0·65	0·60	0·63	0·64	0·73	0·70	0·60	0·68
9	Œstriol	24	22	35	28	30	23	30	24	25	21
	Œstrone	1·4	1·3	1·8	1·2	1·2	1·0	1·0	0·92	0·93	0·93
	Œstradiol	0·38	0·38	0·57	0·48	0·45	0·38	0·40	0·35	0·30	0·33
10	Œstriol	41	33	36	31	36	29	39	30	41	..
	Œstrone	0·29	2·1	1·7	1·6	1·8	1·5	1·8	1·4	2·1	..
	Œstradiol	0·73	0·83	0·70	0·63	0·73	0·70	0·85	0·60	0·90	..

Subject 8

During labour, which lasted 3 hours, the urinary excretion calculated on a 24-hour basis was 44 mg. of œstriol, 1·7 mg. of œstrone, and 0·85 mg. of œstradiol-17β. After delivery, the urinary œstrogen levels fell rapidly. In the case of œstrone and œstradiol-17β there was a linear relationship between the logarithm of the amounts excreted and the time after delivery, and normal non-pregnancy levels were reached within 5 days. In the case of œstriol this linear relationship did not apply so closely, and normal non-pregnancy levels were not reached until 25 days after delivery (fig. 4). Levels were low during lactation and reached a minimum (œstriol 1·0 μg., œstrone 3 μg., œstradiol 0 μg. per 24 hours) at the time when lactation became inadequate and suckling was discontinued. Thereafter the amounts increased slowly.

There was slight vaginal bleeding on the 78th and on the 84th days after delivery when the œstriol and œstrone levels were both approximately 7 μg. per day. Soon

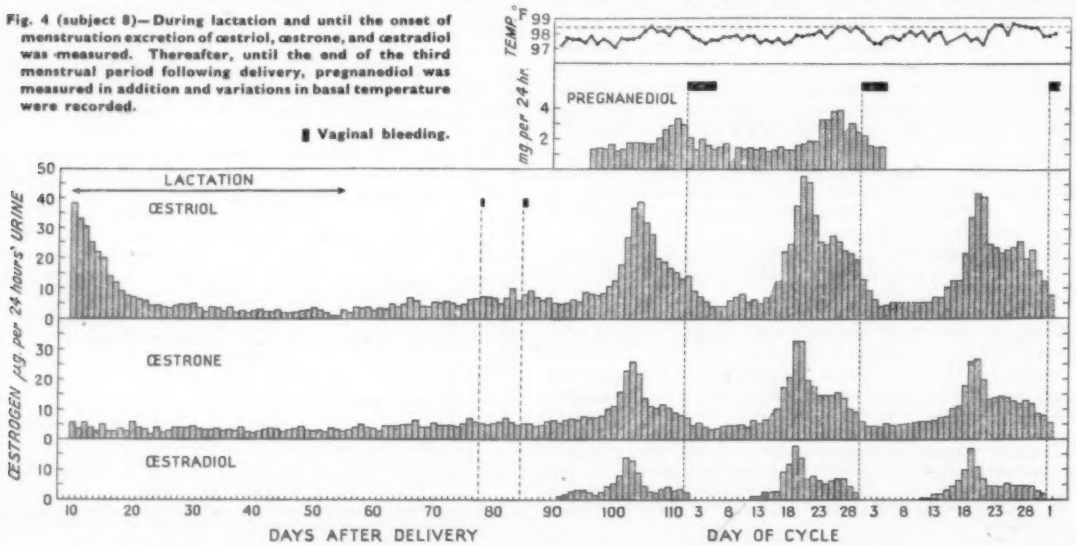


Fig. 4 (subject 8)—During lactation and until the onset of menstruation excretion of œstriol, œstrone, and œstradiol was measured. Thereafter, until the end of the third menstrual period following delivery, pregnanediol was measured in addition and variations in basal temperature were recorded.

▮ Vaginal bleeding.

after this, measurable amounts of œstradiol-17β appeared in the urine and the levels of all three œstrogens rapidly increased and decreased in the manner characteristic of ovulation (Brown 1955b). However, the œstrogen levels did not rise again to a definite luteal maximum and menstrual bleeding began 8 days after the "ovulation" peak. That ovulation followed by a shortened luteal phase had occurred was confirmed by morning basal temperature and urinary pregnanediol measurements.† An ovulation peak followed by a somewhat shortened luteal phase of 10 days was seen during the next menstrual cycle, and during the third menstrual cycle there was a normal luteal maximum and the œstrogen levels throughout were almost identical with those during the menstrual cycle preceding pregnancy.

Discussion

The results reported here are similar to those obtained by other workers, but they give a more detailed picture of some of the changes in urinary œstrogen levels during pregnancy, the puerperium, and lactation.

Œstrogen Level During Pregnancy

The levels found during the menstrual cycle in which pregnancy occurred were very similar to those found during the preceding cycle up to the middle of the luteal phase, after which time they continued to rise slowly instead of falling as they do before menstruation. At about 7 weeks after the last menstrual period, the urinary œstrogen levels began to increase rapidly, being soon outside the range found during a menstrual cycle, and thereafter they followed a smooth exponential curve which flattened somewhat towards the end of pregnancy.

The abrupt change in the œstrogen excretion curve at about 7 weeks might well be due to the changeover from the corpus luteum to the placenta as the major producer of œstrogens. This is earlier than the time suggested for this changeover by Venning (1948) who thought that it took place during the 2nd to 3rd months. However, many workers have noted that the removal of the corpus luteum, even during the first month of pregnancy, does not necessarily cause abortion. Koff and Tulsky (1953) concluded from this evidence, and from their own studies on eight women in whom they estimated urinary pregnanediol before and after removing the corpus luteum, that by the 35th day the placenta by itself secretes enough progesterone to maintain pregnancy. This should apply equally to the œstrogens, and it would therefore seem that the rapid increase in œstrogen excretion observed at 7 weeks is caused mainly by placental production, and that even before this time the placenta is contributing increasingly to the œstrogen levels.

Œstrogen Levels During and After Labour

My findings during late pregnancy and at the onset of labour are very similar to those reported by other workers, and support the conclusions of Bradshaw and Jessop (1953) that there is no correlation between œstrogen excretion and the onset of labour. The considerable day-to-day variations in the excretion of œstrogens in the same woman and the variations in secretion between different women noted by Bradshaw and Jessop were also observed in my series. These differences are masked in the logarithmic scale used in fig. 3 but are shown more clearly in the table.

The rapid decrease in the urinary œstrogen levels following delivery was consistent with sudden removal of the placental source and a continuous metabolism and renal excretion of the remaining œstrogens. (Œstriol was eliminated more slowly than œstrone and œstradiol-17β—an interesting difference observed following single intramuscular injections of these three œstrogens.

† The pregnanediol measurements were kindly performed by Dr. A. Klopper using the method of Klopper, Michie, and Brown (1955).

Œstrogen Levels During Lactation and the Puerperium

The œstrogen levels during lactation were low and were within the range normally found during the early part of a menstrual cycle. After lactation ceased, the œstrogen levels began to increase slowly until the regular rise and fall found during a menstrual cycle was observed. It may be significant that, after the period of lactation amenorrhœa, slight menstrual bleeding occurred when the œstriol and œstrone levels were each approximately 7 μg. per 24 hours. Such levels, when maintained for a period, might represent the minimum amounts of œstrogens required for stimulating endometrial growth; and yet, being within the range normally found at menstruation (Brown 1955b), they might make the stimulated endometrium unstable and precipitate menstruation.

During the first menstrual periods after delivery, ovulation took place, but during the first two periods the luteal phases were abnormally short (8 and 10 days). This is contrary to the belief that the luteal phase always lasts about 14 days. It is possible to envisage a luteal phase so evanescent that it cannot be detected. By all the usual criteria such a menstrual cycle would be considered anovular, and it may well be that brevity of the luteal phase is the explanation of some of the apparently anovular cycles following delivery. The third menstrual cycle appeared to be normal in all respects, and during this cycle the urinary œstrogen levels were almost the same as those found during the menstrual cycle preceding pregnancy. This is a further example of the constancy in the pattern and amounts of œstrogens excreted during different menstrual cycles.

Summary

The urinary excretion of œstriol, œstrone, and œstradiol-17β during conception, pregnancy, the puerperium, lactation, and the recommencement of menstruation has been measured in women. A new chemical method of estimation was employed. The results are discussed.

I wish to thank Prof. G. F. Marrian, F.R.S., and Prof. R. J. Keller, for their interest in this work. I am also grateful to the wives of colleagues who contributed the urine specimens, and especially to the one who made possible the complete study over a period of 17 months. I am also indebted to Mr. H. A. F. Blair and Miss Janet Mackie for their skilled technical assistance.

REFERENCES

Bradshaw, T. E. T., Jessop, W. J. E. (1953) *J. Endocrin.* **9**, 427.
Brown, J. B. (1955a) *Biochem. J.* **60**, 185.
— (1955b) *Lancet*, i, 320.
Clayton, B. E., Marrian, G. F. (1950) *J. Endocrin.* **6**, 232.
Cohen, S. L., Marrian, G. F., Watson, M. (1935) *Lancet*, i, 674.
Jayle, M. F., Crépy, O. (1952) *Ann. Biol. clin.* **10**, 44.
Klopper, A., Michie, E. A., Brown, J. B. (1955) *J. Endocrin.* **12**, 209.
Koff, A. K., Tulsky, A. S. (1953) *Surg. Clin. N. Amer.* **33**, 3.
Marrian, G. F., Bauld, W. S. (1955) *Biochem. J.* **59**, 136.
Pedersen-Bjergaard, G., Pedersen-Bjergaard, K. (1948) *Acta endocr., Copenhagen*, **1**, 263.
Venning, E. H. (1948) *Obstet. Surv., Baltim.* **3**, 661.
Watson, E. J. D., Marrian, G. F. (1955) *Biochem. J.* **61**, xxiv.

"General education . . . is bound to differ according to the different lines of specialisation being followed. It is no good whatever thinking that by laying on a course in literature and a course in current affairs it is possible to give both your scientists and your classics the general education which they need in addition to their special studies. What you must try to do is to make them see their own line of study as one amongst many, and make them see where it stands in the general fabric of human knowledge. You must persuade or cajole or force your scientists to write English coherently. You must make them see that there are other approaches to reality than that of quantity and experiment, and get into their heads some appreciation of literary and artistic and moral values. You must make them see how science has affected human life and give them enough history to enable them to do this . . . general education in its profoundest sense is an essential part of specialist education."—H. D. P. LEE, M.A., headmaster, Winchester College. Report of Home Universities Conference, 1955, p. 19.

ANÆSTHESIA FOR OPERATIVE OBSTETRICS

VALUE OF CUFFED ENDOTRACHEAL TUBE

DAVID J. COLEMAN
M.B. Lond., F.F.A. R.C.S., D.A.
SENIOR REGISTRAR

BRIAN L. DAY
M.A., B.M. Oxfd, F.F.A. R.C.S.
REGISTRAR

DEPARTMENT OF ANÆSTHETICS, ST. GEORGE'S HOSPITAL, LONDON

THE dangers of administering a general anæsthetic to a woman in labour or in whom labour is imminent have recently received considerable attention, particularly from obstetricians (Wrigley et al. 1955). Aspiration of gastric contents during or immediately after anæsthesia is a serious hazard. We seek to show here how this may be averted by the use of a cuffed endotracheal tube.

Mortality and Morbidity

The main cause of maternal mortality resulting from general anæsthesia for obstetric surgery is regurgitation of gastric contents with subsequent aspiration; and, with the reduction of the maternal mortality from other causes, this has assumed a greater significance.

In 1949 Sir William Gilliatt reported that of 55 maternal deaths associated with 34,146 deliveries at twenty-three hospitals, 3 had been due to aspiration of vomit under general anæsthesia. Gilliatt stated that "these are deaths which should not have occurred," and he stressed the importance of a properly trained anæsthetist attending women in labour.

Jeffcoate (1953), reviewing the records of the Liverpool Maternity Hospital for the years 1935–50, found that of 6 maternal deaths 3 had been due to the aspiration of vomit. He stated that "the greatest danger of forceps delivery under general anæsthesia at the present time is anæsthesia."

Parker (1954) described 7 cases of aspiration of vomit at the Birmingham Maternity Hospital; 6 of the patients died. 5 of the cases occurred in a total of 18,524 deliveries in 1943–52.

In the U.S.A. Merrill and Hingson (1953) surveyed the experience of 183 hospitals in 1945–49, and found that there had been 59 maternal deaths due to aspiration of vomit from a total of 2,503,921 births.

Merrill and Hingson estimated that inhalation of vomit accounted for between 1·5 and 2·5% of maternal deaths in the whole of the U.S.A. At a recent meeting at the Royal Society of Medicine (Wrigley et al. 1955) it was considered probable that the figure for *hospital* practice in this country was higher. Besides maternal mortality, maternal morbidity and fœtal mortality due to anæsthesia must be taken into account.

Hartzell and Mininger (1946) recorded 20 cases of bronchopneumonia due to the aspiration of vomit under ether anæsthesia; while Davis and Gready (1946) reported 45 "aspiration accidents," 8 of which were serious. Presumably many more cases occur, but since recovery is complete they are rarely recorded (Merrill and Hingson 1953, McKelvey and Freeman 1954).

As regards infant mortality little is recorded. Anoxia brought about by vomiting must weigh heavily against the fœtus, and it seems reasonable to assume that in some cases it proves fatal.

The Lancet (1955), summarising the present position, noted: "There has been some uneasiness about an apparent increase in the maternal deaths due to anæsthesia; but this may well be only a relative increase, brought about by a fall in the number of deaths from other causes." Whatever the exact position, there appears to be a need to improve anæsthesia for the woman in labour.

The Problem

Labour may last for hours or days, and at any moment it may be necessary to induce anæsthesia. Thus it is impossible both to feed the patient and to prepare her adequately, by modern standards, for operation. A compromise has to be found; and it is now the practice to give women in labour an easily assimilated diet consisting mainly of fluid and glucose. The glucose administered should be isotonic; Morton and Wylie (1951) have drawn attention to the action of hypertonic glucose in slowing gastric emptying and increasing the volume of fluid in the stomach. During labour the gastric emptying-time is prolonged, and Hirscheimer et al. (1938) showed that out of 10 primigravidæ in labour 2 had emptying-times of up to nine hours. In our experience this may often be extended up to eighteen hours; the factors responsible are the presence of a large mass in the abdomen, and the effects of fear and of painful uterine contractions. Moreover, the stomach may become dilated, especially in long labours (Greenhill 1943). From the anæsthetist's point of view it is wise to suppose that the stomach of a woman in labour is never empty.

The obstetrical requirements of anæsthesia are good oxygenation, a light plane of anæsthesia, and moderate muscular relaxation. When a conventional anæsthetic sequence (i.e., nitrous oxide and oxygen with trichlorethylene, ether, or cyclopropane) is being used, an error of judgment by the anæsthetist or a sudden increase of stimulus by the obstetrician may cause laryngeal spasm, lightening of anæsthesia, vomiting, obstruction to the airway, and anoxia. Again, a stormy induction with pronounced excitement and a slow descent through the second stage of anæsthesia will predispose to vomiting. To prevent these complications it is essential that the airway be completely under the control of the anæsthetist; and to ensure this a cuffed endotracheal tube must be used.

Management

The anæsthetic management of the pregnant woman should begin in the antenatal period when the patient should attend classes conducted by the anæsthetist. At these meetings an attempt is made to dispel latent fears of the unknown and of pain by a simple account of the analgesic procedure in labour.

After admission to hospital an easily assimilated diet should be given. It has been suggested that gastric lavage should be attempted before inducing anæsthesia (DeLee and Greenhill 1943), and that if this fails anæsthesia should be carried to the stage of complete sensory loss, and the gastric lavage then repeated effectively. In our experience, however, attempting to pass a Ryle's or œsophageal tube on a woman in labour increases her fear and distress; commonly the quantity of fluid and debris recovered is small (Hirscheimer et al. 1938), and the Ryle's tube may then be returned on the crest of the vomitus wave. We do not attempt to aspirate the stomach unless the patient is actively vomiting at the time of induction. It is then essential to use a large-bore œsophageal tube.

There has been considerable discussion as to the ideal position of the patient for a forceps delivery. Those performing their deliveries with the patient in the left lateral position have been quick to indicate the advantages of this position to the anæsthetist, should vomiting occur. Once intubation has been achieved, the position adopted is of little importance to the anæsthetist, and of course if cæsarean section is to be undertaken there is no choice of position.

From the anæsthetist's point of view the important position is that used during the induction of anæsthesia. If vomiting is expected the Trendelenburg position is usually chosen. The reverse Trendelenburg position,

proposed by Morton and Wylie (1951), was shown by O'Mullane (1954) to be theoretically safe in the presence of passive regurgitation. We induce anæsthesia with the patient lying flat on a tipping-table. If the patient vomits she can be tipped into the Trendelenburg position. Should regurgitation occur after the patient is completely paralysed, a similar position can be adopted. Provided that the patient is completely paralysed and apnœic any regurgitated fluid will tend to drain out of the mouth, and since respiration has stopped such fluid will not be sucked into the chest. The use of a laryngoscope and an efficient suction apparatus enables the pharynx to be cleared rapidly, and intubation is then performed.

The equipment required is the standard anæsthetic equipment with a reliable mechanical sucker. The labour-ward bed must be capable of being rapidly tipped into the head-down position. It is vital that, before anæsthesia is induced, the anæsthetist should check the machine, the laryngoscope, the suction apparatus, the inflatable cuff of the endotracheal tube, and the tipping mechanism of the table.

Atropine sulphate gr. $^1/_{100}$ (0·65 mg.) is given intramuscularly twenty minutes before the operation is started. In emergency it can be given intravenously.

A Gordh needle is inserted into a vein on the dorsum of the hand and strapped into position; this is easily done since the veins are usually prominent owing to increased circulating blood-volume at term. By means of this needle further doses of muscle-relaxant can be quickly given should any difficulty in intubation arise. Anæsthesia is induced with an oxygen-rich mixture of cyclopropane, nitrous oxide, and oxygen, by a closed circuit with an intentional leak and with the absorber cut out. As soon as the patient is unconscious succinylcholine chloride is given (5 mg. per stone) through the Gordh needle. At the onset of paralysis the lungs are gently inflated, adding extra oxygen to the gaseous mixture. It is important to inflate gently; once in our experience vigorous inflation caused regurgitation of fluid into the pharynx. O'Mullane (1954) has shown that any fluid present in the œsophagus after the cricopharyngeus muscle has been paralysed can, by vigorous movement of the lungs, be massaged from the œsophagus into the pharynx. With the onset of full relaxation, laryngoscopy is performed and intubation carried out with a cuffed endotracheal tube. The cuff of the tube is inflated to make a tight fit in the trachea, and artificial respiration is applied until spontaneous respiration has re-established itself. At this point gallamine triethiodide (5 mg. per stone) is administered, and respiration is assisted as necessary, the carbon-dioxide absorber being brought into the circuit.

A light plane of anæsthesia is maintained with cyclopropane, nitrous oxide, and oxygen. Additional doses of gallamine triethiodide may be required. At the end of the operation the endotracheal tube is removed when the patient is becoming conscious, and tracheo-bronchial toilet is performed. On no account must the anæsthetist leave the patient until he is satisfied that she is fully awake and that her general condition is satisfactory.

Discussion

To the anæsthetist a woman in labour presents problems similar to those in cases of intestinal obstruction. All general-anæsthetic techniques in the latter cases are based on the use of a cuffed endotracheal tube to ensure a free airway, and it seems reasonable to use the same well-tried method in obstetric cases. The advantages of using a tube are that once it is in position the anæsthetist has complete control of the airway for the remainder of the administration, that respiration can be easily assisted if required, and, most important of all, that gastric contents are prevented from reaching the trachea, bronchi, and lungs. Further, as Mackenzie et al. (1954) have shown, by this method a given plane of anæsthesia can be obtained with a smaller quantity of anæsthetic agent than otherwise. In obstetric anæsthesia this is important.

The mechanism whereby the fœtus obtains oxygen across the placenta is finely balanced, and any slight suboxygenation in the mother rapidly affects the fœtus. At term, even under optimum conditions, mild anoxia may be present in the fœtus. Any additional anoxia brought about by anæsthetic difficulties will tip the scale against the survival of the fœtus. By the use of a cuffed endotracheal tube, adequate oxygenation can be provided at all times, and should fluid and debris appear in the pharynx the bronchial tree is protected.

The danger of the technique described here arises during the induction of anæsthesia and before intubation. By experienced, efficient, and gentle use of the laryngoscope and sucker, and by keeping a needle in one of the patient's veins, any difficulties that may arise can be overcome. In a series of 100 cases (see table) trouble was experienced twice.

100 CONSECUTIVE HOSPITAL CASES

Operation	No. of cases
Mid-cavity forceps application	74
Cæsarean section	16
Antepartum hæmorrhage	3
Breach delivery	3
Eclampsia	1
Prolapse of cord	1
Extraction of dead fœtus	1
Delivery of anencephalic fœtus	1
Total	100

In the 1st of these 2 cases over-vigorous inflation of the lungs in a paralysed patient squeezed fluid from the œsophagus into the pharynx. This untoward event was treated by laryngoscopy and suction. There were no ill results.

In the 2nd case intubation proved difficult, and a further dose of muscle relaxant was necessary. This case shows the value of the Gordh needle as a means of giving intravenous injections quickly.

Criticism may be levelled against the introduction of a comparatively complicated technique. But, like others (Gilliatt 1949, Jeffcoate 1953), we are certain that there is no place in the labour ward for the inexperienced anæsthetist.

Conclusion

A cuffed endotracheal tube should be used in all cases where general anæsthesia is required for obstetric surgery.

We wish to thank Dr. G. Edwards for encouragement and advice.

REFERENCES

Davis, M. E., Gready, T. G. (1946) *Amer. J. Obstet. Gynec.* **51**, 492.
DeLee, J. B., Greenhill, J. P. (1943) Principles and Practice of Obstetrics. Philadelphia; p. 287.
Gilliatt, W. (1949) Transactions of the 12th British Congress o Obstetrics and Gynæcology. London; p. 269.
Greenhill, J. P. (1943) *Yearb. Obstet.* p. 154.
Hartzell, H. C., Mininger, E. P. (1946) *Surg. Gynec. Obstet.* **82** 427.
Hirscheimer, A., January, D. A., Daversa, J. J. (1938) *Amer. J. Obstet. Gynec.* **36**, 671.
Jeffcoate, T. N. A. (1953) *Brit. med. J.* ii, 951.
Lancet (1955) Annotation, i, 956.
McKelvey, J. L., Freeman, D. W. (1954) *Amer. J. Obstet. Gynec.* **68**, 29.
Mackenzie, A., Pask, E. A., Robson, J. G. (1954) *Brit. J. Anæsth.* **26**, 111.
Merrill, R. B., Hingson, R. A. (1953) *Curr. Res. Anesth.* **30**, 121.
Morton, H. J. V., Wylie, W. D. (1951) *Anæsthesia*, **6**, 190.
O'Mullane, E. J. (1954) *Lancet*, i, 1209.
Parker, R. B. (1954) *Brit. med. J.* ii, 65.
Wrigley, A. J., et al. (1955) *Proc. R. Soc. Med.* (abstr.), **48**, 1089.

A SPECIFIC VIRUS-ANTIBODY FLOCCULATION REACTION WITH POLIOMYELITIS VIRUSES

WILSON SMITH
M.D. Manc., Dip. Bact., F.R.S.

F. W. SHEFFIELD
M.B. Lpool

L. H. LEE
M.B. Malaya

GILLIAN CHURCHER
M.B. Lond.

From the Department of Bacteriology, University College Hospital Medical School, London

IN a recent publication from this laboratory Belyavin (1955) reported a macroscopically visible flocculation reaction between influenza viruses and their specific antisera. His subsequent work, much of it still unpublished, has firmly established the value of the reaction both as a research tool for the investigation of virus structure and strain relationships and as a practical method—simple, rapid, and flexible—for the assay of serum antibodies.

The question whether such direct flocculation would take place with other viruses, especially those of a different order of size and possessed of quite different biological characteristics, seemed to us to be of great scientific interest and importance. Poliomyelitis viruses were chosen for investigation for the additional reason that a simple in-vitro method of typing poliomyelitis viruses and of detecting and assaying antibodies is urgently required; present available methods can be used only in specially equipped laboratories and even there impose severe limitations on the amount of work which can be undertaken because they are so expensive and time-consuming. The urgency of this need is considered to justify present publication of the results of experiments which are obviously of a preliminary nature but which, nevertheless, show conclusively that poliomyelitis viruses react with homologous serum antibodies to form, under appropriate conditions, easily visible floccules, and that the reaction is type-specific. We are under no illusions as to the amount of further work needed to establish the full significance of this reaction and to determine the range of its practical applicability, but we believe that it opens up a new line of approach to many outstanding problems of poliomyelitis.

Materials and Methods

Poliomyelitis Viruses

Virus strains used were Brunhilde (type 1), Lansing and Y.ŚK (type 2), and Leon (type 3). Seed pools of each were prepared as required and stored at −20°C.

Cultivation of Virus

The viruses were propagated in HeLa cell cultures. The HeLa cells were grown in the medium recommended by Sheffield and Smith (1956). Small cultures in Sanders bottles were used for the routine passage of virus and for titrating virus, but for the production of flocculating antigens larger cultures in babies' feeding-bottles made of 'Pyrex' glass were made to obtain sufficient quantities of virus. Each bottle received an inoculum of about 4×10^6 HeLa cells which, with medium changes on the 3rd and 5th days of incubation, gave cultures of about 40×10^6 cells by the 7th day. On the 7th day all medium was removed and the cells were washed thrice with Earle's solution. An inoculum of 0·05 ml. or 0·10 ml. seed virus was added to each bottle followed by 10 ml. maintenance medium. Incubation was continued at 37°C on a roller drum for a further 48 hours, at which time the virus fluids were harvested. Two different maintenance media have been used: 'Parker 199' with 10% rabbit serum; and Earle's solution 85%, 5% solution of lactalbumin hydrolysate 5%, and rabbit serum 10%. Both of them have proved satisfactory, though we now prefer the second because of its simplicity.

Preparation of Virus Antigens

These were prepared by concentration and purification of virus from the culture fluids. Batches of pooled virus fluids were first centrifuged in a horizontal centrifuge at 1500 r.p.m. for 15 minutes to remove gross particles. They were then clarified by centrifugation in the 'Spinco Rotor No. 21' at 15,000 r.p.m. for 42 minutes. This treatment removes much extraneous material without depositing any appreciable quantity of virus. From the clarified supernatant fluid virus was deposited by high-speed centrifugation for 5 hours in the 'Spinco Rotor No. 30' at 30,000 r.p.m. The supernatant fluid containing small molecular constituents of the medium but only negligible amounts of virus was discarded, and the deposited pellet of each tube was resuspended in either 1·0 ml. or 0·5 ml. of saline solution. Tube capacity was 38·5 ml.; so the nominal virus concentration factor was either × 38·5 or × 77. Perfectly homogeneous suspension of the material in such small volumes of saline solution, however, was impossible. Pooled virus concentrates were therefore given a final clarifying spin in the horizontal centrifuge at 1500 r.p.m. for 15 minutes. The resultant suspensions of virus were distinctly opalescent but entirely free from visible particles when viewed in a viewing-box with the aid of a hand lens. They were used as antigens both for the flocculation experiments and for the immunisation of rabbits. They received no treatment for inactivation of the virus, nor was any preservative added.

Preparation of Antisera

Rabbits were immunised by intravenous inoculations of the virus concentrates described above. Two doses were given with an interval of 14 days. Samples of blood were taken at various intervals thereafter. Some rabbits were given a third dose of virus after a rest period of several weeks, followed again by bleeding at intervals. The adoption of a uniform immunisation schedule was impossible because at that time nothing was known about the immunological responses of rabbits to poliomyelitis viruses; moreover, as the virus concentrates were used as soon as possible after their preparation, the amount of virus contained in each dose was not known until several days later, when the results of titrations in HeLa-cell cultures were obtained. The full range of sera will be used eventually for a more detailed study of the immunological responses of rabbits; but, for the flocculation experiments, only three of the samples, one against each virus type, were used. They were obtained thus:

Rabbit no.	*Virus antigen*	*Day*	*Inoculation TCD/50 × 10⁶*
4/55	Type 1 (Brunhilde)	0	1·60
		14	1·75
		24	Bled
1/56	Type 2 (Lansing)	0	0·063
		14	0·24
		24	Bled
3/56	Type 3 (Leon)	0	0·50
		14	0·63
		51	1·20
		58	Bled

Serum was separated from the clotted blood after overnight storage in the refrigerator, freed from cells by centrifugation, doubly inactivated by two separate heat treatments, each at 56°C for 30 minutes, and stored in the frozen state until required. It is not known whether double inactivation is necessary, but it was adopted because of its importance in influenza-virus flocculation (Belyavin 1956).

Flocculation Technique

Flocculation tests were done by the standard method of bacterial agglutination. 0·3-ml. quantities of each reagent, virus antigen and antiserum, were mixed in Dreyer agglutination tubes. Dilutions of reagents were

made in physiological saline solution. Racks were held in a 37°C water-bath so that the columns of reaction mixtures were about two-thirds submerged. Readings were made at intervals against the black background of an agglutination viewing-box. A hand lens (× 5) was used to extend the range of particle visibility.

Recording of Results

An arbitrary choice of symbols for recording degrees of flocculation is unavoidable. For our detailed records we used a range of plus signs from + + + +, indicating complete flocculation with sedimentation to the bottom of the tube, down to ±, indicating fine particulation only just detectable with a hand lens. In addition, various degrees of opalescence were noted. For the sake of clarity records presented in tables I–III have been simplified, and the symbols have the following meanings :

+ + + Complete or almost complete flocculation
+ + Floccules uniformly distributed and easily visible to naked eye
+ Fine particles visible with hand lens—includes particulation ranging from that on verge of naked-eye visibility to that only just visible with lens
op Opalescence of any degree greater than that of the antigen-saline control mixture
– No sign of any reaction

It should be emphasised that the flocculation is just as easy to read as a routine agglutination test with suspensions of bacteria, and that the adoption of a titration end-point analogous with "standard agglutination" would present no difficulty.

To avoid possible confusion dilutions of antigens and antisera shown in the tables represent the initial dilutions before mixing. Actual dilutions in the reaction mixture were of course twofold higher.

Experimental Results

The design and scope of the experiments recorded were necessarily conditioned by the rigorously limited capacity of our small laboratory to produce antigens. The production of a few ml. of a single virus type antigen utilises our full resources for a fortnight; and, as nothing is yet known about the effects of storage, it was considered unwise to accumulate batches for experiments on a more adequate scale.

Cross-test with Brunhilde and Lansing

The first flocculation of poliomyelitis virus took place in the experiment recorded in table I. The speed of visible flocculation of Brunhilde antigen with the homologous serum at 1 in 5 dilution raised, at the time, serious doubt of its validity as a specific reaction, but it is now known to reflect the phenomenon of optimal-proportions precipitation (Dean and Webb 1926). The Lansing reagents did not particulate, though the development of opalescence markedly in excess of that shown by antigen control mixtures was unequivocal. There are two obvious reasons for this weak Lansing reaction. Reference to the rabbit-immunisation schedule shows that the amounts of Lansing virus inoculated were only a fraction of the amounts of Brunhilde and Leon viruses given; later experience has shown that such a small antigenic stimulus was unlikely to provoke a satisfactory antibody response. Even with a very potent antiserum it is unlikely that the Lansing antigen would have flocculated. Results of infectivity titrations on the two virus concentrates were :

Brunhilde antigen TCD 50/m³. = $10^{-5.3}$
Lansing „ „ = $10^{-6.3}$

On the basis of tissue-culture infectivity, therefore, the Brunhilde antigen was 250 times more concentrated than the Lansing antigen. As all efforts to improve the yield of Lansing virus from HeLa-cell cultures failed, it was decided to abandon this strain temporarily and to continue the investigation with Brunhilde and Leon viruses.

TABLE I—CROSS-TESTS WITH BRUNHILDE AND LANSING REAGENTS

Antigens	Period of incubation (37°C)	Brun. serum		Lans. serum		Antigen controls
		1/1	1/5	1/1	1/5	
Brunhilde ..	5 min.	op	+ +	–	–	–
	2½ hr.	+ +	+ + +	–	–	–
Lansing ..	5 min.	–	–	op	op	–
	2½ hr.	–	–	op	op	–
Serum controls	..	–	–	–	–	–

For explanation of symbols see text.

Chess-board Titration of Brunhilde Reagents

The titration recorded in table II was made to study the effects of dilution of reagents and the period of incubation of reaction mixtures. Reactivity of the serum at dilutions greater than 1 in 40 was not expected; so the dilution range used was too limited to give the serum end-points. The reaction showed the characteristics of precipitation such as occurs in many serum-antiserum systems rather than of bacterial agglutination. It is clear that antigen concentration was the dominant and critical factor; beyond 1 in 8 dilution no trace even of opalescence was discernible, and for practical tests only the antigen undiluted or at 1 in 2 dilution would have been satisfactory. The progression of the reaction throughout the four-hour period of observation emphasises the importance of the relative proportions of antigen and antibody. Optimal-proportions precipitation was evident in each antigen-dilution row with well-marked inhibition in the region of antibody excess. Indeed it is apparent that, even with a good antigen, flocculation may be absent with very potent sera unless the latter are diluted sufficiently to extend beyond the zone of inhibition. The occurrence of flocculation through a wide range of serum dilutions indicates the possibility of comparative serum titrations by means of the reaction.

TABLE II—CHESS-BOARD TITRATION OF BRUNHILDE REAGENTS

Time of incubation at 37°C	Brunhilde antigen dilution	Brunhilde serum dilutions					Antigen controls
		1/1	1/5	1/10	1/20	1/40	
½ hr. ..	1/1	op	+	+	+	+	–
	1/2	op	op	op	+	+	–
	1/4	–	–	–	–	–	–
	1/8	–	–	–	–	–	–
	1/16	–	–	–	–	–	–
2½ hr. ..	1/1	+	+ + +	+ + +	+ + +	+ + +	–
	1/2	op	+ +	+ + +	+ +	+ +	–
	1/4	op	op	op	+	+	–
	1/8	op	op	op	op	+	–
	1/16	–	–	–	–	–	–
4 hr. ..	1/1	+	+ + +	+ + +	+ + +	+ + +	–
	1/2	op	+ + +	+ + +	+ + +	+ + +	–
	1/4	op	op	+ +	+ +	+ +	–
	1/8	op	op	op	+	+	–
	1/16	–	–	–	–	–	–
	Serum controls	–	–	–	–	–	–

Cross-tests of Brunhilde and Leon by Chess-board Titrations

Preliminary experiments with a Leon-virus antigen showed that it was flocculated by various dilutions of the Leon antiserum and not at all by Brunhilde serum. An extensive cross-test using chess-board titrations was therefore made.

The results of the final reading after 4 hours' incubation at 37°C are presented in table III. They afford a clear demonstration of the type-specificity of the flocculation reaction. The occurrence of opalescence, however, in the most concentrated cross-type mixtures is interesting. It may be due to contaminant antigenic material derived

TABLE III—CROSS-CHESS-BOARD TITRATIONS OF BRUNHILDE AND LEON REAGENTS

Antigens		Brunhilde serum						Leon serum					
		1/10	1/20	1/40	1/80	1/160	1/320	1/10	1/20	1/40	1/80	1/160	1/320
Brunhilde	1/1	+ + +	+ + +	+ +	+	op	−	op	op	..	..	..	..
	1/2	+ + +	+ + +	+ + +	+	−	−	−	−	..	..	..	..
	1/4	+ +	+ +	+ +	+ +	−	−	−	−	..	..	..	..
	1/8	+	+	+	+	−	−	−	−	..	..	..	..
	1/16	−	−	−	−	−	−	−	−	..	..	..	..
Leon	1/1	op	−	..	..	..	..	+ + +	+ + +	+ + +	op	−	−
	1/2	−	−	..	..	..	..	+ + +	+ + +	+ + +	+ +	−	−
	1/4	−	−	..	..	..	..	+ + +	+ + +	+ + +	+ + +	+	−
	1/8	−	−	..	..	..	..	+	+	+	+ +	+ +	−
	1/16	−	−	..	..	..	..	−	−	−	−	+	−

Final reading at 4 hr. incubation.

from the HeLa cells but may equally well be an indication of an antigenic relationship between poliomyelitis viruses of different types similar to that which has been shown to exist between influenza viruses of types A and B (Smith et al. 1955).

Periodic readings from 30 minutes to the final reading at 4 hours showed progressive development and extension of flocculation with both virus types similar to the development illustrated by table II. In this experiment Leon reagents flocculated more rapidly than Brunhilde and gave a beautiful demonstration of inhibition in the zone of antibody excess in spite of the omission of serum dilutions lower than 1 in 10. Optimal flocculation tubes in each row were clearly recognisable at some stage of the observation period, shifting one tube to the right with each progressive twofold dilution of the antigen. Even so, except for a single tube, flocculation was confined to dilutions of antigen 1 in 8 or less. Also, with Leon reagents, very little extension of flocculation occurred after 2 hours, whereas with Brunhilde reagents the flocculation area at 2 hours was less than half that shown at 4 hours.

Flocculation of Type-2 Virus

All that it is possible to say at present is that the flocculation reaction does take place with type-2 virus and is likely to follow the same pattern as that with the viruses of types 1 and 3. The relatively poor growth of the Lansing strain in Hela-cell cultures led us to abandon it to concentrate on work with Brunhilde and Leon. Recently we have established cultures of the Y.SK strain of type-2 virus in HeLa cells and prepared antigens for rabbit immunisation, but a strain-specific homologous antiserum is not yet available. The Y.SK antigen, however, has been shown to flocculate with a rabbit antiserum against strain MEF1 kindly supplied by Dr. Tyrrell; it shows no sign of flocculation with our Brunhilde and Leon antisera.

Reactions with Human Sera

With the reagents so far available only a few preliminary tests of human sera have been possible, but these have clearly shown that poliomyelitis viruses may be flocculated by the type-specific antibodies which occur as a result of natural infection. Brunhilde antigen was flocculated by both acute and convalescent sera of a proved case of type-1 non-paralytic poliomyelitis in a child of 3 years, whereas neither serum showed any trace of reaction with Leon antigen. Conversely, the convalescent serum of a proved case of type-3 paralytic poliomyelitis in a child of 18 months flocculated the Leon antigen but not the Brunhilde antigen. The acute-stage serum of this patient did not flocculate either antigen. The tests were done with serum dilutions of 1 in 5 and 1 in 10.

Discussion

Discovery of a new phenomenon inevitably leads to speculation. It is therefore important to distinguish clearly between what must be accepted as fact and what is merely possibility. The essential facts definitely established by our experiments may be stated in very simple terms. An antigen-antibody reaction occurs in a mixture containing poliomyelitis virus and its homologous antiserum which under appropriate conditions and with suitable preparations of the virus antigen leads to macroscopic flocculation; furthermore, the reaction is strictly type-specific. It must be emphasised, however, that, so far, this flocculation phenomenon has been demonstrated only with antigens made from single strains of each virus type, with antisera from immunised rabbits, and with human sera from two cases of poliomyelitis in young children. Even so, it is quite certain that direct poliomyelitis-virus flocculation can now be used as a research tool to explore the surface structure of these viruses and to investigate some of their biological characteristics.

One of the most urgent needs in current work on poliomyelitis is a simple and rapid in-vitro method of typing virus and of detecting and assaying the serum antibodies concerned in protection against infection. The value of such a method in the fields of serological diagnosis, production, and standardisation of vaccines and epidemiology would be incalculable. There is obviously a possibility, perhaps even a probability, that the direct virus-flocculation reaction may meet this need. If so, its simplicity and rapidity are such that tests could be made almost anywhere, because the only apparatus needed would be agglutination tubes, racks, graduated pipettes, and a water-bath. Results of a titration are as easy to read as those of a routine Widal test. But the possibility can only be determined by further work along several different lines. The number of relevant problems calling for investigation is too large to categorise, but those of particular urgency are the question of stability of the virus antigens, the correlation of flocculating antibodies with the neutralising and complement-fixing antibodies of various kinds of sera, the possibility that the reaction may be not only type-specific but also strain-specific, and the possible occurrence in sera of non-specific flocculation-inhibitors. One essential for systematic attack on each of these problems is an adequate supply of antigens of all three types of virus from different strains. Though this would present no difficulty, given the equipment for virus culture on a really large scale, a microflocculation method would be advantageous for many kinds of test. Work to this end has already yielded very promising results which, if confirmed, will be published shortly.

Summary

A direct poliomyelitis-virus flocculation-reaction is described. This is type-specific and occurs in mixtures of concentrated suspensions of virus and homologous rabbit antisera. Flocculation has also been demonstrated with human sera from two cases of poliomyelitis in children.

Possible uses of the reaction and the relative problems requiring investigation are briefly outlined.

We are greatly indebted to the National Fund for Poliomyelitis Research for a grant in support of Dr. Churcher and a research expenses grant. Expenses of the work have also been partially defrayed from financial support given to the department by the Medical Research Council. Dr. Lee is in receipt of a W.H.O. fellowship. Thanks are due to Dr. Alistair Dudgeon for the sera from 2 cases of poliomyelitis; to Dr. D. A. J. Tyrrell for a sample of type-2 rabbit antiserum; and to Dr. W. Wood, of Glaxo Laboratories Ltd., for supplies of 'Parker 199' medium.

REFERENCES

Belyavin, G. (1955) *Lancet*, i, 698.
— (1956) *Brit. J. exp. Path.* **37**, 75.
Dean, H. R., Webb, R. A. (1926) *J. Path. Bact.* **29**, 473.
Sheffield, F. W., Smith, W. (1956) *Brit. J. exp. Path.* **37**, 5.
Smith, W., Belyavin, G., Sheffield, F. W. (1955) *Proc. roy. Soc.* B, **143**, 504.

DURATION OF VASODILATATION AFTER LUMBAR SYMPATHECTOMY

A. McPHERSON
M.B. Lpool, M.R.C.P.
LAMING EVANS RESEARCH FELLOW,
ROYAL COLLEGE OF SURGEONS OF ENGLAND

A. W. L. KESSEL
M.B.E., M.C., F.R.C.S.
CLINICAL RESEARCH ASSISTANT, INSTITUTE OF ORTHOPÆDICS, LONDON

IN 1929 Lewis and Landis stated that in man the blood-vessels of the hand recovered their vasoconstrictor tone within four days after cervicodorsal sympathectomy. They based their opinion on clinical observation, but since then many observers have investigated the blood-flow of the limbs after sympathectomy and have concluded that it returns to the preoperative level within weeks, or at most months, after operation. Detailed plethysmographic studies have been made by Grant and Pearson (1938), Wilkins and Eichna (1941), Grayson (1948), Barcroft and Walker (1949), Lynn and Barcroft (1950), and Walker et al. (1950), whose results confirm the transient nature of the vasodilatation in the persons they investigated.

Many explanations for this recovery of tone after sympathectomy have been advanced, the more important of which may be summarised as follows:

(1) The arteries become hypersensitive to adrenaline or to an unknown hormone (Meltzer and Auer 1904, Freeman et al. 1934, Smithwick et al. 1934, Grant 1935, White et al. 1936, Ascroft 1936, Simmons and Sheehan 1939, LeCompte 1941).

(2) The muscle-fibres of the arteries contract because of some "intrinsic property" of the muscle itself (Cannon 1937, Doupe 1943).

(3) Accessory sympathetic pathways which do not pass through the sympathetic trunk are left untouched by the operation (Richter and Woodruff 1945, Pick and Sheehan 1946, Skoog 1947, Boyd 1948, Ray and Console 1948, Boyd and Munro 1949, Wrete 1950).

(4) Regrowth of the damaged sympathetic axons may re-establish connections with the blood-vessels (Lee 1930, Geohegan and Adair 1942).

A few investigators have stated that vasodilatation following sympathetic denervation may last a long time: Adson and Brown (1929) reported persistently raised temperature of the toes after lumbar sympathectomy in man, and Ross (1946) wrote: "The sympathetic denervation following a well-planned and correctly executed operation is permanent, as shown by sweating tests in addition to vasomotor reactions."

The present investigation of the blood-flow and vasomotor reflexes of patients who had undergone lumbar sympathectomy for the relief of vascular symptoms (coldness, cyanosis, and chilblains) formed part of a larger investigation of the involvement of the autonomic nervous system in poliomyelitis (Kessel and McPherson 1953, McPherson and Kessel 1955).

Methods

The blood-flow in both feet of 14 patients (eighteen lumbar sympathectomies) was examined by venous-occlusion plethysmography. Of the 14 sympathectomised patients 12 had poliomyelitis, 1 a birth palsy affecting the lower limbs, and 1 a hemiplegia during early childhood. The sympathectomies were done by surgeons in several hospitals. The controls consisted of 30 healthy people and 30 patients who had poliomyelitis but had not undergone sympathectomy. The plethysmographs had volume recorders as described by Cooper and Kerslake (1951), and the investigations were made in a quiet, draught-free, heat-controlled room with the subject lying on a rubber mattress. The lower limbs were immersed up to the thighs in water at a temperature of about 36°C for about thirty minutes before the insertion of the feet in the plethysmographs, to equalise their temperature as far as possible. The investigations were made at room-temperatures of 21–25°C, but in any one investigation the room-temperature did not vary more than ±1°C. The plethysmograph temperatures varied from 31·5 to 33·75°C, but in any one investigation did not vary more than ±0·25°C. The difference in temperature between the two plethysmographs was never greater than 0·25°C. Collecting pressures of 75–85 mm. Hg were used throughout and were identical in both cuffs.

Records were made at intervals of 5–15 seconds, and the investigation of each subject included measurements of blood-flow under three conditions: (1) normal heat exchange (i.e., the patient was covered by a light blanket at normal room-temperature); (2) reflex vasodilatation (i.e., after warming the arms in water-baths at 45°C and warming the body with a radiant-heat lamp until profuse sweating took place); and (3) reflex vasoconstriction (i.e., while the warming was continuing, ice was suddenly placed on the forehead without warning).

The blood-flow was calculated from the average of twenty inflow curves except after reflex vasoconstriction, when it was calculated from the succeeding three inflow curves.

The results of these tests are shown in table I.

TABLE I—BLOOD-FLOW OF SYMPATHECTOMISED PATIENTS
(ml. per 100 c.cm. of tissue a minute)

Patient no.	Normal heat exchange		Reflex vasodilatation		Reflex vasoconstriction	
	Operated side	Non-operated side	Operated side	Non-operated side	Operated side	Non-operated side
1	9·9	..	6·7	..	6·7	..
	10·2	..	7·2	..	7·5	..
2	15·7	4·3	15·9	19·5	15·2	17·5
3	6·0	1·9	11·5	12·3	13·4	8·1
4	7·3	..	8·6	..	10·7	..
	10·9	..	9·0	..	11·2	..
5*	16·8	5·9	20·6	21·7	18·1	19·6
6†	4·5	1·4	5·6	17·3	4·3	6·7
7	4·4	5·1	26·8	27·9	25·9	25·9
8	2·8	..	17·2	..	15·4	..
	3·0	..	14·1	..	9·3	..
9	7·2	2·1	9·2	10·1	9·3	4·5
10	21·2	4·3	15·4	23·1	17·0	13·7
11	13·6	..	13·3	..	12·3	..
	11·8	..	11·3	..	12·8	..
12	5·0	2·0	15·7	24·0	10·0	11·7
13	3·0	2·2	5·9	16·9	4·8	12·1
14	9·0	2·0	10·4	16·9	8·9	10·2

* Hemiplegic. † Birth palsy.

The means of the controls are given in table II together with the mean blood-flows of the sympathectomised patients.

The blood-flows of all the subjects studied are shown in fig. 1. The reasons for the small differences in blood-flow of healthy people and non-sympathectomised patients with poliomyelitis are analysed in detail elsewhere (McPherson and Kessel 1955). For our present purpose these differences are ignored.

TABLE II—BLOOD-FLOW
(ml. per 100 c.cm. of tissue a minute)

—	Normal heat exchange		Reflex vaso-dilatation		Reflex vaso-constriction	
	Operated side	Non-operated side	Operated side	Non-operated side	Operated side	Non-operated side
Sympathectomised patients ..	9·0	3·1	12·4	19·0	11·8	13·0
Non-sympathectomised patients ..	..	2·8	..	14·1	..	9·4
Healthy people	..	3·1	..	14·8	..	9·3

The technical quality of the operations was assessed by an independent examination of the operation notes without prior knowledge of the blood-flow estimations. The criteria used in this assessment were: (1) the description of the operation in the notes, the difficulties of access, the amount of hæmorrhage, &c.; (2) the surgeon's estimate of the amount of sympathetic tissue removed; and (3) histological evidence of the removal of sympathetic nervous tissue. Although such an assessment is bound to be imprecise it nevertheless gives a reasonable idea of the technical efficiency of the operation, each being classified as "good," "bad," or "doubtful." Table III shows the results of this analysis together with the time between the operation and the blood-flow estimation, the presence or absence of the vasomotor reflexes, and the degree and duration of improvement in the patient's vascular symptoms after the operation. A "t" test of the difference between the means of the blood-flow of "good" and "bad" operations shows that this difference is statistically significant ($p<0.01$).

The comparison of the blood-flow under conditions of normal heat exchange and the assessment of the quality of the operations are shown graphically in fig. 2.

Illustrative Case-reports

Patient 10.—Female. Born 1899. Attack of anterior poliomyelitis during infancy affecting mainly the right lower limb. Coldness, cyanosis, and chilblains of the right leg since the age of 21.

March, 1952: extensive right lumbar sympathectomy during which no technical difficulties were encountered. In surgeon's opinion D12–L3 sympathetic ganglia were removed. A total length of seven inches of sympathetic chain was removed, including a double chain between the L2 and L3 ganglia. Histological examination confirmed the removal of sympathetic nervous tissue.

Result.—The patient's symptoms were considerably improved after sympathectomy, and this improvement has been maintained. Blood-flow of feet examined thirty-five months after operation: resting blood-flow on operated side was 21·2 ml. per 100 c.cm. of tissue per minute.

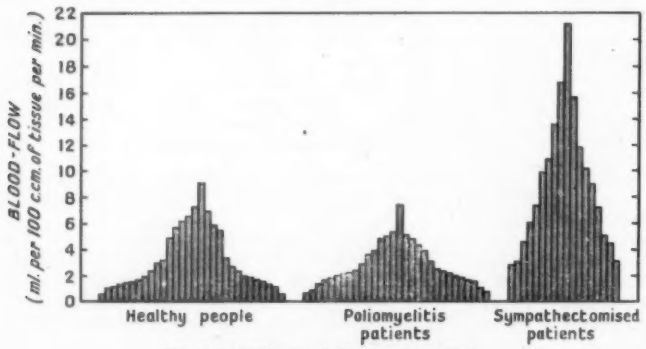


Fig. 1—Blood-flows of all persons studied.

Patient 9.—Female. Born 1937. Attack of anterior poliomyelitis in 1942 affecting mainly the left lower limb. Coldness, cyanosis, chilblains, and ulceration of the left leg since 1948.

October, 1953: left lumbar sympathectomy during which there was moderate venous bleeding and the ganglia were difficult to identify. In surgeon's opinion only L2 ganglion had been removed. Histological examination confirmed the presence of sympathetic nervous tissue.

Result.—After the operation there was moderate improvement in the patient's vascular symptoms which lasted for only two months. Blood-flow of feet examined sixteen months after the operation: resting blood-flow on operated side was 7·2 ml. per 100 c.cm. of tissue a minute.

Discussion

An interesting feature of this investigation is that only one of the eighteen operations to remove sympathetic ganglia failed to produce some improvement, however short-lived, in the patient's symptoms. Of the 8 patients subjected to operations described as "bad" 2 showed an improvement which was still maintained when the blood-flow was investigated; 5 showed an improvement which persisted for some months; and 1 showed no improvement.

TABLE III—ANALYSIS OF RESULTS

Patient no.	Operated side	Assessment of operation	Normal heat exchange blood-flow (ml. per 100 c.cm. per min.)	Time since operation (mos.)	Vasomotor reflexes	Symptomatic improvement	
						Quality	Duration (mos.)
1	Both	Good	9·9	20	–	Good	20
		Good	10·2	20	–	Good	20
2	Right	Good	15·7	21	–	Good	21
4	Left	Good	10·9	17	–	Good	17
5	Right	Good	16·8	43	–	Good	43
10	Right	Good	21·2	35	–	Good	35
11	Both	Good	13·6	180	–	Good	180
		Good	11·8	22	–	Good	22
14	Right	Good	9·0	11	–	Good	11
Mean			13·2	41			41
3	Left	Bad	6·0	43	+	Good	30
6	Right	Bad	4·5	25	–	Good	25
7	Right	Bad	4·4	21	+	None	0
8	Both	Bad	2·8	67	+	Slight	2
		Bad	3·0	66	+	Slight	3
9	Left	Bad	7·2	16	–	Mod'te	2
12	Right	Bad	5·0	26	+	Good	26
13	Left	Bad	3·0	25	–	Good	12
Mean			4·5	36			8·5
4	Right	Doubtful	7·3	17	–	Good	17

Perhaps the temporary amelioration of the vascular symptoms that follows a "bad" lumbar sympathectomy is explained by the temporary interruption of nervous control of the blood-vessels and the subsequent recovery of local arterial tone, as described by other workers. The temporary vasodilatation occurs, as can be shown by plethysmography, even in cases in which there is no histological evidence of any sympathetic nervous tissue having been removed—e.g., patient 8. Moreover the fact that, in this investigation, every patient whose vasodilatation was only temporary had a "bad" operation is unlikely to be explained merely by coincidence. In our opinion it appears more likely that any attempt to remove sympathetic ganglia produces sufficient trauma of sympathetic nervous tissue to produce a temporary paresis of the sympathetic nerve-supply to the blood-vessels, even though no nervous tissue may have been resected. The eventual recovery of arterial tone could then be

partly explained by the recovery of the paretic sympathetic nerve-fibres and/or transmission in sympathetic synopses.

It is obvious that recovery from temporary injury to sympathetic nervous tissue cannot explain all the features of the recovery of arterial tone following some sympathectomies. Some weeks or months after sympathectomy many patients have a blood-flow which is little different from the preoperative level, and in these patients it is often impossible to demonstrate any vasomotor reflexes. Patients 6, 9, and 13, for example, had no vasomotor reflexes twenty-five, sixteen, and twenty-five months respectively after operation.

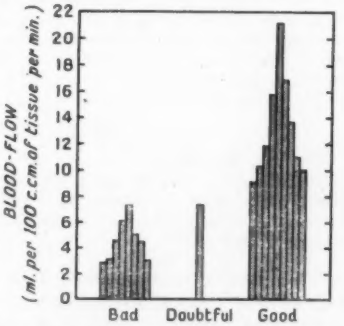


Fig. 2—Comparison of blood-flows and assessment of operations.

Barcroft (1952) has suggested that the symptomatic improvement which follows sympathectomy, even though the arteries have regained their tone, can be explained by the protection of the blood-vessels from vasoconstrictor stimuli which these sympathectomies provide. The results of the present investigation suggest that the situation is more complex than this. Patient 12, for example, had a considerable and long-lasting improvement in his vascular symptoms, even though the vasomotor reflexes were still present. Conversely, patient 9 had only a moderate and transient improvement in his symptoms, although no vasomotor reflexes could be demonstrated sixteen months after his operation.

It is usually assumed that the absence of vasomotor reflexes definitely indicates that the blood-vessels have been deprived of their sympathetic innervation. Hertzman (1954), however, has stated that, in his experience, a negative reflex vasodilatation test is uncertain evidence of sympathetic denervation, and Lynn (1954) has described patients whose vasomotor reflexes were absent but whose sudomotor activity was still present in the same limbs. The fact that in the present investigation the vasomotor reflexes in the feet were sometimes absent regardless of the quality of the operation is, perhaps, supporting evidence for the conclusions of Hertzman, although it is unlikely that this is the entire explanation of the phenomenon. The results reported here suggest that both the absence of vasomotor reflexes and the resting blood-flow level must be considered together as criteria for the adequacy of the sympathectomy.

2 of the adequately sympathectomised patients (nos. 1 and 10) showed a decrease in the level of blood-flow after reflex heating. Patient 10 showed the larger decrease in blood-flow on reflex vasodilatation (5·8 ml. per 100 c.cm. of tissue a minute), and this was the patient who had all ganglia resected from T12 to L3 inclusive.

The results of this investigation suggest that the statement, sometimes made, that a patient has "had a sympathectomy," merely because an operation was done with this intention, is likely to be misleading. Sympathectomy may be difficult even in the most experienced and skilled hands, and its effects on the circulation may be extremely variable. Table III shows that technically good operations for lumbar sympathectomy produce a considerable increase in the blood-flow in the feet, and this vasodilatation may last for as long as fifteen years. Such operations can produce a persistent vasodilatation which is almost as great (90%) as the "maximal" vasodilatation produced by heating the arms and body of healthy people. On the other hand, technically poor operations for sympathectomy produce no persistent vasodilatation.

The results obtained from the small series of patients investigated in this study indicate that, when an adequate sympathectomy is done, the denervated blood-vessels do not regain their tone.

It is difficult to suggest what constitutes a good lumbar sympathectomy, but the results reported here support the view of Hertzman (1954): "we feel that the surgeon must do a practically total lumbar ganglionectomy in order to increase the incidence of therapeutic gains." It is unfortunate that operations for sympathetic denervation have become less popular because of the reported recovery of vascular tone following the operation. The present investigation supports the opinion of Ross (1946) that, when a sympathectomy is adequate, the results are long-lasting. Further support for this point of view is provided by the fact that most of the sympathectomies producing a lasting vasodilatation were done by one surgeon who always removes, when possible, all the lumbar ganglia.

Summary

The blood-flow in the feet of 14 patients with paralysed limbs who had had a lumbar sympathectomy (eighteen operations on 14 patients) was measured by venous-occlusion plethysmography. These blood-flows were compared with two control groups consisting of 30 poliomyelitis patients who had not had a sympathectomy and 30 healthy people.

Those operations for sympathectomy which were technically good produced a lasting dilatation in the blood-vessels of the feet.

Those operations which were technically bad did not produce a lasting vasodilatation.

Our thanks are due to Mr. H. J. Seddon for his continual advice and encouragement; and the surgeons of the various hospitals, particularly Mr. G. W. L. Bonney, of the Institute of Orthopædics, who made it possible for us to examine their patients.

REFERENCES

Adson, W. A., Brown, G. E. (1929) *Surg. Gynec. Obstet.* **48**, 577.
Ascroft, P. B. (1936) *Brit. J. Surg.* **24**, 787.
Barcroft, H. (1952) *Brit. med. Bull.* **8**, 363.
— Walker, A. J. (1949) *Lancet*, i, 1035.
Boyd, A. M. (1948) *Proc. R. Soc. Med.* **41**, 370.
Boyd, J. D., Monro, P. A. G. (1949) *Lancet*, ii, 892.
Cannon, W. B. (1937) *Amer. Heart. J.* **14**, 383.
Cooper, K. E., Kerslake, D. McK. (1951) *J. Physiol.* **114**, 1P.
Doupe, J. (1943) *J. Neurol. Psychiat.* **6**, 97.
Freeman, N. E., Smithwick, R. H., White, J. C. (1934) *Amer. J. Physiol.* **107**, 529.
Geohegan, W. A., Adair, O. J. (1942) *Proc. Soc. exp. Biol., N.Y.* **50**, 365.
Grant, R. T. (1935) *Clin. Sci.* **2**, 1.
— Pearson, R. S. B. (1938) *Ibid*, **3**, 119.
Grayson, J. (1948) M.D. thesis, University of Manchester.
Hertzman, A. B. (1954) *In* Wolstenholme, G. E. W., Freeman, J. S. Peripheral Circulation in Man. London.
Kessel, A. W. L., McPherson, A. (1953) *J. Physiol.* **120**, 24P.
LeCompte, P. M. (1941) *Amer. J. Physiol.* **135**, 43.
Lee, F. C. (1930) *Res. Publ. Ass. nerv. ment. Dis.* **9**, 417.
Lewis, T., Landis, E. M. (1929) *Heart*, **15**, 151.
Lynn, R. B. (1954) *In* Wolstenholme, G. E. W., Freeman, J. S. Peripheral Circulation in Man. London.
— Barcroft, H. (1950) *Lancet*, i, 1105.
McPherson, A., Kessel, A. W. L. (1955) *Clin. Sci.* **14**, 361.
Meltzer, S. J., Auer, C. M. (1904) *Amer. J. Physiol.* **11**, 28.
Pick, J., Sheehan, D. (1946) *J. Anat.* **80**, 12.
Ray, B. S., Console, A. D. (1948) *J. Neurosurg.* **5**, 23.
Richter, C. P., Woodruff, B. G. (1945) *J. Neurophysiol.* **8**, 323.
Ross, J. P. (1946) *Brit. med. J.* i, 1.
Simmons, H. T., Sheehan, D. (1939) *Brit. J. Surg.* **27**, 234.
Skoog, T. (1947) *Lancet*, ii, 457.
Smithwick, R. H., Freeman, N. E., White, J. C. (1934) *Arch. Surg., Chicago*, **29**, 759.
Walker, A. J., Lynn, R. B., Barcroft, H. (1950) *St Thom. Hosp. Rep.* **6**, 18.
White, J. C., Okelberry, A. M., Whitelaw, G. P. (1936) *Arch. Neurol. Psychiat.* **36**, 1251.
Wilkins, R. W., Eichna, L. W. (1941) *Bull. Johns Hopk. Hosp.* **68**, 425.
Wrete, M. (1950) *Arch. int. Stud. Neurol.* **1**, 1.

MIXED STAPHYLOCOCCAL INFECTIONS
THE DEVELOPMENT OF PENICILLIN-RESISTANT STRAINS

R. W. FAIRBROTHER
T.D., M.D., D.Sc. Manc., F.R.C.P.
DIRECTOR OF CLINICAL PATHOLOGY, MANCHESTER ROYAL INFIRMARY; HON. READER IN CLINICAL PATHOLOGY IN THE UNIVERSITY OF MANCHESTER

STAPHYLOCOCCAL infections constitute a major clinical problem, particularly in hospitals. They are relatively numerous (ranging from a mild superficial pustule to a fulminating pneumonia or enterocolitis) and an increasing proportion of them are caused by strains resistant to antibiotics, especially penicillin.

Barber and Rozwadowska-Dowzenko (1948) drew attention to the rising incidence of penicillin-resistant strains of *Staphylococcus aureus* by reporting that, in the same London hospital, the number had risen from 14% in 1946 to 59% in 1948. Many similar reports have since been published, and at present in the U.S.A. it is considered that 75–80% of staphylococcal infections in hospitals are caused by penicillin-resistant strains (Long 1955, Spink 1955). This high incidence is, so far, confined to inpatients, but there is some evidence that penicillin-resistant infections are also appearing with greater frequency among outpatients (Rees et al. 1955).

The origin of penicillin-resistant strains has not been satisfactorily explained. It has, however, been firmly established (1) that the resistance of naturally occurring strains of *Staph. aureus* to penicillin is due to the production of the enzyme penicillinase, and (2) that this enzyme is not produced by strains rendered resistant to penicillin in the laboratory. Thus there are two quite distinct mechanisms whereby resistance to penicillin is developed. I deal here with only the naturally occurring penicillin-resistant strains—i.e., the producers of penicillinase. It has been found that these strains are unstable: Barber (1949) obtained penicillin-sensitive variants from old cultures of penicillin-resistant strains of *Staph. aureus*, and Fairbrother et al. (1954) found that such variants readily appeared during the incubation of penicillin-resistant strains at 44°C. Penicillinase-producing variants have not, however, been obtained from cultures of penicillin-sensitive strains of *Staph. aureus*.

Investigations into the appearance of variants in infections have been few: Barber and Whitehead (1949) reported the isolation of both penicillin-sensitive and penicillin-resistant strains of *Staph. aureus* from the same patient; but from somewhat inconclusive phage-typing and serological tests they concluded that the strains were of different types and therefore had separate origins. Fairbrother et al. (1954) isolated penicillin-sensitive and penicillin-resistant colonies of *Staph. aureus* from the same cultures of infective material and found that, on six occasions, these had the same phage pattern, probably originating from the same parent strain.

The present investigation is a continuation of the study of the development of variant strains of *Staph. aureus* under natural and experimental conditions and provides a further explanation of the probable origin of the variant strains.

Methods

All material from infections was routinely seeded on to appropriate media, including blood-agar plates, and, after overnight incubation, plate cultures exhibiting colonies of *Staph. aureus* were selected for study. After careful examination with a hand lens representative colonies were selected for coagulase and sensitivity tests; if any variation in the colonial appearance was detected, 10–20 discrete colonies were investigated. The coagulase tests were done by the tube technique. The antibiotic-sensitivity tests were initially made by the disc and strip techniques with pure cultures; but, where indicated, the serial dilution method was also used (Fairbrother and Martyn 1951). The penicillinase tests were done by the cylinder technique. The strains were phage-typed at the Public Health Laboratory, Manchester.

Throughout this work penicillin-sensitive strains of *Staph. aureus* proved to be coagulase-positive, were inhibited by $^1/_{16}$–$^1/_{32}$ unit per ml. of penicillin, gave a clear zone round the penicillin discs, and did not produce penicillinase. Penicillin-resistant strains of *Staph. aureus* were coagulase-positive, produced penicillinase, did not give a clear zone round the penicillin discs, and were not inhibited by at least 10 units per ml. of penicillin.

Results

The results fall conveniently into two main groups: those obtained in vivo from the examination of pus or other material from infections; and those produced in vitro with strains of *Staph. aureus* recently isolated from human infections.

ISOLATION FROM INFECTIVE PROCESSES

Incidence of Penicillin-resistant Strains

There are many reports, from different parts of the world, of the increase in penicillin-resistant strains isolated from hospital communities. Since the introduction of the disc technique in 1950 sensitivity tests have been made in this hospital as a routine, and analysis of consecutive samples of strains isolated at different times from the total hospital population (table I) shows an increasing incidence of penicillin resistance.

A more detailed analysis of the 1955 figures shows that 142 of the 550 strains were isolated from outpatients and

TABLE I—INCIDENCE OF PENICILLIN-RESISTANT STRAINS OF *Staph. aureus*

Period	No. in sample	No. penicillin-resistant
1950–51	600	252 (42%)
1953–54	300	172 (57%)
1955	550	312 (57%)

52 (37%) of these were penicillin-resistant, whereas 260 (64%) of the 408 strains isolated from inpatients were resistant. There was thus a much higher incidence of resistant strains among the inpatients, although the outpatient figures tended to be rather higher than those previously reported (Forbes 1949, Rees et al. 1955). The outpatient strains were collected largely from chronic and subacute infections, many of which had already been treated unsuccessfully with penicillin. Moreover among the strains from inpatients many were isolated from severe fulminating infections admitted as urgency cases; these are really representative of strains from the general population rather than the hospital.

During this period 60 strains of *Staph. aureus* were isolated from material sent by general practitioners from a health centre, and 20 (33%) were penicillin-resistant. There is thus disturbing evidence that the incidence of penicillin-resistant strains among the general community is also increasing.

Appearance of Variants in Infections

The possibility of staphylococcal variants developing in vivo has received little attention. Barber and Whitehead (1949) isolated penicillin-sensitive and penicillin-resistant strains of *Staph. aureus* from 11 patients, but in 8 of these patients one or both of the pairs of organisms were untypable; it was concluded that the organisms were probably of different origins. Fairbrother et al. (1954) found that 6 of 13 mixed cultures gave the same phage pattern and probably originated from the same parent strain.

Further investigations were made. Colonies were studied in many cultures; in the great majority the colonies appeared identical on examination with the hand lens, and sensitivity tests of a representative sample

TABLE II—ISOLATION FROM SAME SPECIMEN OF PAIRS OF *Staph. aureus* DIFFERING IN REACTION TO PENICILLIN

—	No. of pairs	Phage-pattern of pair		
		Same	Doubtful (one of pair untypable)	Different
Old series (Fairbrother et al. 1954)	13	6	2	5
New series	12	5	3	4
Total	25	11	5	9

(10–50 colonies) gave uniform results. Occasionally, however, slight differences among the colonies were detected in either production of pigment, size, or zone of hæmolysis on a blood-agar plate; on rare occasions a few colonies were found in the clear zone around an antibiotic disc. Sensitivity tests often proved regular, but in a few cases differences in behaviour towards the various antibiotics were observed (tables II and III).

Despite the large number examined, differences in the reaction of individual colonies to penicillin were observed with only 12 cultures prepared from the same lesion. Of these 12 pairs, 5 strains gave the same phage pattern, 4 proved to be quite different, and in 3 pairs one at least of the strains proved to be untypable.

In the two series of investigations 25 pairs were isolated, and 11 of these gave the same phage pattern: it is reasonable to assume that they had originated from the same parent strain in vivo. In 5 of 25 pairs the typing results were inconclusive. The reaction to penicillin of the organisms originally responsible for the infection could not be determined, and it was therefore impossible to identify the variant strains. The pairs of *Staph. aureus*, although reacting differently to penicillin, behaved consistently towards the other antibiotics.

During this work a comparable variation in reaction of individual colonies to other antibiotics (chloramphenicol, tetracyclines, or streptomycin) was also observed on a few occasions (table III). In 6 of 15 infections variant strains seem to have developed in vivo. This problem was, however, left for further study.

IN-VITRO PRODUCTION OF VARIANT STRAINS

As there are serious practical limitations to the study of the mode of development of variant strains of *Staph. aureus* under natural conditions, further investigations were made into the appearance, under experimental conditions, of (1) penicillin-sensitive variants from apparently pure cultures of penicillinase-producing strains of *Staph. aureus*; and (2) penicillinase-producing variants from apparently pure cultures of penicillin-sensitive organisms.

Development of Penicillin-sensitive Variants from Penicillinase-producing Strains

Although many workers have claimed that penicillinase-producing strains of *Staph. aureus* are permanently resistant to penicillin, there is now much evidence that they are very unstable (Barber 1949, Fairbrother et al. 1954). Further tests demonstrated the instability of penicillin-resistant strains of *Staph. aureus* grown in a water-bath at 44°C.

Penicillin-resistant colonies of *Staph. aureus* were selected from recent cultures of infected material; subcultures were prepared on agar plates; and, after overnight incubation, sensitivity tests were made on 10–20 discrete colonies. If all proved resistant to penicillin, a subculture of a discrete colony from the first subculture was prepared and again sensitivity tests were made on individual colonies. If these proved satisfactory one of these penicillin-resistant colonies was seeded into 10 ml. of broth and incubated in a water-bath at 44°C; coagulase and penicillinase tests were done at the same time to ensure that a true penicillin-resistant strain was being investigated. Serial subcultures in broth were made usually every one to three days, to give a final total of 20; at intervals plate cultures were also prepared, by means of a large loop, for colony tests of penicillin sensitivity by the strip technique.

TABLE III—ISOLATION FROM SAME SPECIMEN OF PAIRS OF *Staph. aureus* DIFFERING IN REACTION TO STREPTOMYCIN, CHLORAMPHENICOL, OR TETRACYCLINES

Phage-pattern of pair	No. of pairs isolated
Same	6
Doubtful (one of pair untypable)	5
Different	4

14 penicillin-resistant strains of *Staph. aureus* were examined in this way (table IV) and 10 were found to produce penicillin-sensitive variants. Of the total of 21 strains so far examined, 14 produced variants. In some cases the penicillin-sensitive variants were detected after only one or two subcultures, but in the case of other strains the variants did not appear until later. In some cases the penicillin-sensitive variants exhibited definite colonial changes, the colonies being larger and less pigmented, but in other cases the colonies appeared to be identical with those of the penicillin-resistant strains. In all cases the phage patterns were either identical or showed only minor variations.

TABLE IV—PRODUCTION OF PENICILLIN-SENSITIVE VARIANTS FROM PENICILLINASE-PRODUCING STRAINS OF *Staph. aureus* BY INCUBATION AT 44°C

—	No. of strains tested	Incidence of penicillin-sensitive variants
Old series (Fairbrother et al. 1954) ..	7	4
New series	14	10
Total	21	14

Thus it appears that penicillin-sensitive organisms readily develop from apparently pure cultures of penicillinase-producing strains of *Staph. aureus* during growth at 44°C, which is about the highest temperature allowing active growth of this organism. The intermittent subculturing of a single loopful of a broth culture and the examination of about 100 colonies during 20 subcultures do not constitute particularly exacting tests for the detection of penicillin-sensitive variants; so probably, if more rigorous methods had been used, penicillin-sensitive variants might have been detected in every case.

Appearance of Penicillinase-producing Variants in Cultures of Penicillin-sensitive Strains of Staph. aureus

While there is no doubt about the instability of penicillinase producing strains of *Staph. aureus*, there is as yet no unequivocal report of the isolation of penicillinase-producing organisms from apparently pure cultures of sensitive strains.

Initially abortive attempts were made to achieve this by growing penicillin-sensitive organisms in media containing small amounts of either penicillinase or penicillin. Subsequent subculture on to agar plates and examination of discrete colonies failed to reveal any penicillinase-producing variants. It was then decided to try serial subculture in broth at 33–35°C.

Sensitive strains of *Staph. aureus* which did not produce penicillinase were used, and a discrete colony from a plate, seeded with a discrete colony from the primary culture, was used as the original inoculum. After inoculation of the broth an agar plate was seeded, and all the colonies tested from this proved to be penicillin-sensitive. In this way attempts were made to ensure that a pure penicillin-sensitive culture was being investigated. At least 20 serial subcultures were made, and at intervals colony tests were made.

8 strains were thus tested, but on no occasion was a penicillin-resistant colony detected (table V).

TABLE V—DEVELOPMENT OF PENICILLINASE-PRODUCING VARIANTS FROM PENICILLIN-SENSITIVE STRAINS OF *Staph. aureus*

Source of original culture	No. tested	Incidence of penicillinase-producing variants
Infected material	8	0
Variant colonies from resistant strains	8	2

A further series was then tested, and in this the organism used for the test was a penicillin-sensitive variant of an originally penicillin-resistant strain (table IV). The original inoculum was a discrete colony from a culture of the penicillin-sensitive variant. At all stages of isolation this organism proved to be sensitive to $^1/_{16}$–$^1/_{32}$ unit per ml. of penicillin and did not produce penicillinase. From 2 of 8 strains tested penicillinase-producing variants were isolated (table V); one was isolated after 8 subcultures, and the other after 15 subcultures in broth at 33°C. In one case the penicillin-sensitive variant could not establish itself in the culture, but in the other it became predominant. At all stages the identity of the organism was checked by phage-typing.

Discussion

The high incidence, in this hospital, of staphylococcal infections caused by penicillin-resistant strains agrees with the general pattern in this and other countries, and evidence was also obtained of an increasing incidence of penicillin-resistant strains among the general population. The relatively high rate (37%) in outpatient infections was not altogether surprising, because many of these were chronic or subacute lesions which had not responded to outside treatment, usually with penicillin. It is not difficult to explain the prevalence of penicillin-resistant strains in hospitals where cross-infection is easy, and the personnel are often carriers; but the ultimate origin of these strains is uncertain.

The main explanations offered for the appearance of naturally occurring penicillin-resistant strains of *Staph. aureus* are: (1) the acquisition of adaptive enzymes through some metabolic adjustment; (2) the spontaneous appearance of resistant mutants; (3) the survival of rare resistant mutants during penicillin therapy; and (4) a combination of these factors.

It is generally accepted that the naturally occurring penicillin-resistant strains differ from penicillin-sensitive strains mainly, if not solely, by their capacity to produce penicillinase. Moreover it has been established that penicillin-sensitive strains of *Staph. aureus*, rendered resistant to penicillin by serial transfer in increasing concentrations of penicillin, do not form penicillinase, and that this type of acquired resistance tends to be temporary. Little information is available about the possible appearance of mutants or variants in infections; Barber and Whitehead (1949) held that penicillin-sensitive and penicillin-resistant strains isolated from the same patient tended to belong to different phage-types and thus had separate origins.

It is generally assumed that the penicillin-resistant organisms are the variant or mutant strains (Barber and Burston 1955). This, however, may not be so. Another possibility is that the *Staph. aureus*, in its original form, was resistant to penicillin, and that the penicillin-sensitive strains are the variants or mutants. *Staph. aureus* is tough and hardy, differing considerably from most other pathogenic organisms of the upper respiratory tract; it is the only member to produce penicillinase or readily to develop resistance to penicillin. Although the main reservoir of this organism is now the human nares, this may not always have been the case. Probably *Staph. aureus* existed formerly under relatively wild conditions in which the capacity to produce penicillinase would be a distinct asset for the survival of the species. Penicillinase has little or no value in the cell economy; it appears to be mainly concerned with the survival of the organism. When the *Staph. aureus* became established in the human nares, penicillinase was no longer needed as a defence mechanism, and the capacity to produce this enzyme gradually declined, as an evolutionary process.

When penicillin was first introduced as a therapeutic agent, a few penicillin-resistant strains were reported by different observers, although previous contact with penicillin was unlikely. These strains represented the survivors of the original wild *Staph. aureus*; they possessed some essential factors of the enzyme system, which is probably controlled by some primitive form of genetic system and is hereditary. Subsequent contact with penicillin stimulated the production of penicillinase and eliminated many penicillin-sensitive strains; hence the high incidence of penicillin-resistant strains in hospital.

Support for this hypothesis is obtained from the results of the present investigation, which has shown that penicillin-resistant strains of *Staph. aureus* readily produced penicillin-sensitive variants in vitro, whereas penicillin-sensitive strains appeared to produce penicillinase-forming variants rarely and only then in special circumstances in which possibly some of the enzyme system was still present in the original culture. This is not altogether unexpected, because it is easier to lose an enzyme system than to gain one.

It is therefore probable that, when both penicillin-sensitive and penicillin-resistant strains of *Staph. aureus*, with an identical phage pattern, are isolated from the same lesion, the original infecting organisms were either penicillinase-producing strains readily forming penicillin-sensitive variants during the course of the infection, or penicillin-sensitive staphylococci still possessing essential traces of the enzyme factor.

An increase in the number of penicillin-resistant infections throughout the general community seems inevitable, particularly if the practice of using penicillin indiscriminately for all forms of trivial infection continues. A serious development is the great increase of severe infections caused by penicillin-resistant strains of *Staph. aureus*, for which the use of penicillin is not only valueless but also may be dangerous because it delays the introduction of an effective antibiotic. A stricter control of penicillin therapy is urgently required.

Summary

Of 550 strains of *Staph. aureus* recently isolated from infections 312 (57%) were penicillin-resistant. Previous figures for the same hospital were 42% in 1950–51 and 57% in 1953–54. The incidence of penicillin-resistant strains among outpatients was 37%.

Penicillin-sensitive and penicillin-resistant *Staph. aureus* with the same phage pattern were isolated from the same lesion on 11 different occasions; this suggests a common origin for these organisms.

Penicillin-sensitive variants were readily obtained from penicillinase-producing strains of *Staph. aureus* by growth at 44°C.

Attempts to obtain penicillinase-producing strains from naturally occurring penicillin-sensitive strains of *Staph. aureus* were unsuccessful. Such variants were, however, produced by 2 of 8 apparently penicillin-sensitive strains obtained by growing penicillinase-producing organisms at 44°C.

It is suggested that *Staph. aureus* formerly led a wild existence in which it produced penicillinase, and that this function was later largely, but not entirely, lost by prolonged adaptation to the human nares.

It is a pleasure to thank Dr. M. T. Parker for the phage-typing results, and my colleagues in the department for technical assistance.

References at foot of next column

STAPHYLOCOCCI HARBOURED BY PEOPLE IN WESTERN HIGHLANDS OF NEW GUINEA

PHYLLIS M. ROUNTREE
D.Sc. Melb., Dip. Bact.
From the Fairfax Institute of Pathology, Royal Prince Alfred Hospital, Sydney, Australia

NUMEROUS investigators have reported a steadily increasing prevalence of penicillin-resistant strains of *Staphylococcus aureus* in civilised communities (e.g., Barber and Burston 1955, Terrial and Chabbert 1955). Many of these strains appear to have been detected in hospital environments, but there is still some debate on their origin since penicillinase-producing strains may also be found in people who have not been admitted to hospital. There are fewer reports of the antibiotic resistances of coagulase-negative staphylococci, but 50% of a series of 444 strains of this kind isolated in this hospital in 1954–55 were penicillin-resistant.

Unfortunately, few collections of staphylococci isolated before the introduction of penicillin are available for study. Anderson (1946), however, examined 396 strains; of these, 281 were coagulase-positive and sensitive to penicillin, while of the remaining non-pathogens "a few" were penicillinase producers. Furthermore, there are now few parts of the world where penicillin has not been freely used. Hopps et al. (1954) reported that 43 strains of *Staph. aureus* obtained from skin lesions of Dusuns of North Borneo were penicillin-sensitive, although 3 produced penicillinase. Similarly, 14 strains from skin lesions in people indigenous to tropical Mexico were penicillin-sensitive, 5 being penicillinase producers. In both these groups of people "antibiotic usage was minimal." It should be noted, however, that both groups have a long history of contact with white people.

In the Wabag region of the Western Highlands of New Guinea lives a group of people who have had very little contact with civilisation (Elkin 1953). Their existence was unknown before 1910; the area in which they live was first penetrated in 1934, and since that time no more than 30 white people have had contact with them—and even such contact has been slight (Macintosh 1955).

These Wabaga, numbering approximately 200,000, live in a mountainous region 85 by 100 miles in area, in discrete family units, not in villages but in homesteads. They are exceedingly primitive and have a minimum of material culture. Ethnically, they appear to be distinct from their mountain neighbours and from the Papuans inhabiting the coastal regions, but their origin is still undecided. In 1946, after the area had been closed since 1938, administrative buildings and an airstrip were built in one locality (Wabag), and in 1949 a native hospital was established. However, as the Wabaga are free from yaws, there has been no mass campaign of penicillin therapy in the region.

The recent Nuffield expedition to the region provided an opportunity to take nasal swabs from some of these people. The 120 men swabbed were scattered throughout the area. So far as could be ascertained, none had ever received any antibiotics. Two groups of swabs were taken from men in areas where contact had been limited to the occasional passage of administrative patrols. The remainder of the swabs were taken from men in areas where there had been some contact with the administration and missionaries.

DR. FAIRBROTHER: REFERENCES

Barber, M. (1949) *J. gen. Microbiol.* **3**, 274.
— Burston, J. (1955) *Lancet*, ii, 578.
— Rozwadowska-Dowzenko, M. (1948) *Ibid*, ii, 641.
— Whitehead, J. E. M. (1949) *Brit. med. J.* ii, 565.
Fairbrother, R. W., Martyn, G. (1951) *J. clin. Path.* **4**, 374.
— Parker, L., Eaton, B. R. (1954) *J. gen. Microbiol.* **10**, 309.
Forbes, G. B. (1949) *Brit. med. J.* ii, 569.
Long, P. H. (1955) *Antibiot. Chemother.* **5**, suppl. 1, p. 33.
Rees, E. G., Shooter, R. A., Shawe, G. D. H. (1955) *Brit. med. J.* i, 1409.
Spink, W. W. (1955) *Antibiot. Chemother.* **5**, suppl. 1, p. 74.

Methods

The swabs were inoculated immediately on to nutrient-agar slopes in screw-capped bottles and dispatched by air to Sydney for examination.

Representative inocula from the slopes were transferred to blood-agar plates. After incubation, single colonies of various degress of pigmentation were picked for further study. Not more than three colonial types were isolated from any one swab.

Tests for sensitivity to penicillin, streptomycin, oxytetracycline, chlortetracycline (aureomycin), and chloramphenicol were carried out in the first place by a disc-plate method (Rountree and Thomson 1949, 1952). Strains showing the same amount of inhibition as the control Oxford H strain were regarded as sensitive. Strains showing less inhibition than the control were tested by a tube-method. With penicillin, small inocula of 0·02 ml. of a 10^{-4} dilution of an overnight broth-culture were used to inoculate serial dilutions of the antibiotic in 1 ml. broth. With the other antibiotics, 0·02 ml. of undiluted broth-cultures were used as inocula. Results were read after eighteen hours' incubation at 37°C.

Strains partially or completely resistant to penicillin by the plate method were tested for penicillinase production by the method of Voureka and Hughes (1949).

Certain strains were tested for ability to ferment glucose and to give the Voges-Proskauer reaction (Shaw et al. 1951).

Results

Pathogenic Staphylococci

Only 23 carriers of coagulase-positive *Staph. aureus* were found—a carrier-rate of 19·1%. However, the high proportion of cultures yielding coagulase-negative strains indicated that carriers of pathogens had not been missed because methods of collection or transport of the material were unsuitable for the survival of staphylococci. All strains produced α-toxin, but no β-toxin was detected on 5% sheep-blood-agar plates. All strains were sensitive to the five antibiotics.

TABLE I—PHAGE-TYPE DISTRIBUTION OF STRAINS OF *Staph. aureus*

Phage-group	Phage pattern	Number of strains reacting at		No. in group
		R.T.D.	10^{-1}	
I	52/52A/79/80	..	1	..
	52A/80	..	1	..
	79	1	1	7
	79/80	1	..	..
	80	1	1	..
II	3A/3B/3C/55	2	..	..
	3B/3C/55	1	..	4
	55	1	..	..
III	6/31B/47/53/54/75/81	1	..	..
	7/47/54/77/81	..	1	..
	7/77/81	..	1	..
	31B	1	..	7
	53	1	..	..
	81	..	2	..
IV	42D	1	..	1
Unclassifiable	42D/81	1	..	2
	7/29/42D/47/53/73/79/80/81	1	..	..
Untypable				2
Total		13	8	23

R.T.D. = routine test dilution

The strains were phage-typed with the results shown in table I. The seventeen patterns observed among the 23 strains are found in strains isolated from civilised communities. It was noted, however, that 8 of the strains reacted only when the phages were applied in high concentration, suggesting some minor difference in their behaviour compared with the strains normally examined

in this laboratory, where only 17·6% of 419 penicillin-sensitive strains isolated in 1954–55 from outpatients were not typable at the routine test dilution.

Representatives of all four broad phage-groups were found, but the number of strains isolated is too small for comparison of their frequency distribution with those found elsewhere.

Where two or more strains were isolated from men living in the same locality the strains proved to be of different phage-patterns. Although the total number of strains isolated was disappointingly low, the diversity of patterns found indicated that a fair sample of the pathogenic staphylococci present had been examined.

Non-pathogenic Staphylococci

110 strains of non-pathogenic (coagulase-negative) staphylococci were examined for antibiotic sensitivity (table II).

87 of these strains conformed to the definition of *Staph. saprophyticus* of Shaw et al. (1951), all giving a positive Voges-Proskauer reaction; 80 were white and 7 produced a yellow or golden pigment. 6 (7%) of these strains were more resistant to penicillin than the control Oxford strain and produced penicillinase. Using small inocula, they grew in concentrations of penicillin ranging from 0·075 to 0·6 unit per ml. 2 of these strains were resistant also to chloramphenicol, growing in 125 μg. per ml. 1 strain grew in 2 mg. per ml. of streptomycin, in 250 μg. per ml. of chlortetracycline, and in 60 μg. per ml. of chloramphenicol. In addition, 1 penicillin-sensitive strain grew in 125 μg. per ml. of chlortetracycline.

TABLE II—PENICILLIN-SENSITIVITY OF COAGULASE-NEGATIVE STAPHYLOCOCCI

Species	Pigment production	No. of strains	Penicillin-resistant	Penicillinase producers
Staph. saprophyticus	White	80	6	6
	Yellow	7	..	..
Staph. lactis	White	6	1	1
	Yellow	17	12	11
Total		110	19 (17·3%)	18

23 strains were classified as *Staph. lactis* (Shaw et al. 1951) since they fermented glucose but were acetoin-negative. 17 of these strains produced varying degrees of pigment, ranging from pale yellow to golden. Their colonies were more opaque than those of *Staph. aureus*, and confluent growth on agar displayed a metallic or iridescent sheen. 12 such strains were penicillin-resistant and 11 produced penicillinase. None was resistant to any of the other antibiotics.

Discussion

The low prevalence (19%) of nasal carriers of pathogenic staphylococci among the Wabaga, compared with that of 30–50% found in civilised communities, may be commented on. It is tempting to correlate this finding with the small amount of clothing, ordinarily only a few leaves, worn by these people, with the absence of communal bathing-places (indeed, they wash but rarely), and with their relatively solitary manner of living in small groups. These habits, together with their paucity of articles of material culture and the absence of indoor communal meeting-places, suggest that they may have fewer opportunities to exchange their staphylococci than have urban communities. It would be of some interest to compare their carrier-rates with those in civilised but isolated agricultural communities.

It is as yet undecided where these primitive people originated or for how long they have lived in the region; but it is likely that, until recently, they had been isolated for many centuries. It is quite improbable that they could have acquired the variety of types of *Staph. aureus* isolated from them by the limited contact that they have had with white people in recent years. It is therefore of considerable interest that their strains of *Staph. aureus* were similar to those found in civilised man. The antiquity of man's association with the staphylococcus has been discussed elsewhere (Rountree 1955).

Finally, the presence of antibiotic-resistant strains, although all were non-pathogens, indicated that such strains can indeed occur naturally in the absence of antibiotics manufactured by man.

Summary

23 of 120 people of the Wabag region of New Guinea were nasal carriers of *Staph. aureus*.

None of these strains was antibiotic-resistant, but some non-pathogenic staphylococci found in nasal swabs were resistant to antibiotics.

Phage-typing of the strains isolated from these primitive people showed that these were similar to those found in civilised man.

This work was supported in part by the Australian National Health and Medical Research Council. My thanks are due to members of the Nuffield Expedition, and in particular to Mr. B. Lockett who collected the swabs and to Prof. N. W. G. Macintosh. Miss Judith Rheuben and Mr. K. Miller gave valuable laboratory assistance.

REFERENCES

Anderson, G. (1946) Cited by North, E. A., Christie, R., Rank, B. K. *Med. J. Aust.* ii, 43.
Barber, M., Burston, J. (1955) *Lancet*, ii, 578.
Elkin, A. P. (1953) *Oceania*, **23**, 161.
Hopps, H. E., Wisseman, C. L., Whelan, J. (1954) *Antibiot. Chemother.* **4**, 270.
Macintosh, N. W. G. (1955) Personal communication.
Rountree, P. M. (1955) Australian and New Zealand Association for the Advancement of Science. Report of 30th meeting; p. 175.
— Thomson, E. F. (1949) *Lancet*, ii, 501.
— — (1952) *Ibid.* ii, 262.
Shaw, C., Stitt, J., Cowan, S. T. (1951) *J. gen. Microbiol.* **5**, 1010.
Terrial, G., Chabbert, Y. (1955) *Ann. Inst. Pasteur*, **88**, 777.
Voureka, A., Hughes, W. H. (1949) *Brit. med. J.* i, 395.

EFFECT OF VITAMIN-K DOSAGE ON PLASMA-BILIRUBIN LEVELS IN PREMATURE INFANTS

J. P. BOUND
M.D. Lond., M.R.C.P., D.C.H.
FIRST ASSISTANT, CHILDREN'S DEPARTMENT
T. P. TELFER
M.B. Melb., D.Path.
REGISTRAR, DEPARTMENT OF CLINICAL PATHOLOGY
UNIVERSITY COLLEGE HOSPITAL, LONDON

THE effects of large and small doses of a water-soluble vitamin-K analogue ('Synkavit') on plasma-bilirubin levels of premature babies on the fifth day of life are compared here.

Investigation

In September, 1954, we began routine estimations of the fifth-day plasma-bilirubin levels in all surviving premature babies. It was hoped that, by correlating these levels with the previous histories of the babies and their subsequent fate, criteria might be established for giving an exchange transfusion to prevent the development of kernicterus in premature babies showing no evidence of blood-group incompatibility. We were particularly interested in the number of infants attaining plasma-bilirubin levels over 18 mg. per 100 ml., which is perhaps the upper limit of safety as regards liability to develop kernicterus in hæmolytic disease of the newborn due to blood group incompatibility (Mollison and Cutbush 1951). The fifth day was chosen because it appeared that preventive action would usually be required at that

time, since, in our experience, symptoms of kernicterus commonly develop on the sixth or seventh day and only occasionally on the fifth day.

Following reports by Allison (1955) and Laurance (1955) that the administration of large doses of vitamin-K analogues to premature infants was potentially dangerous in relation to the development of kernicterus, we reduced the routine dose of synkavit given after birth from a total of 30 mg. in the first seventy-two hours to 1 mg. on the first day. The effect of this change of dosage on the plasma-bilirubin levels forms the basis of this report.

Materials and Methods

Plasma-bilirubin levels were estimated in two groups of premature babies:

Group A consists of the 55 survivors of 72 infants admitted to the premature-baby unit from September, 1954, to April, 1955, inclusive, 17 having died before the fifth day of life. They received 10 mg. of synkavit daily by intramuscular injection for three days. There were 26 males and 29 females; 17 were twins; their birth-weights ranged from 2 lb. 5 oz. to 5 lb. 7 oz.

Group B consists of the 51 survivors of 60 infants admitted from May to November, 1955, 9 having died before the fifth day. They received a single injection of 1 mg. of synkavit on the first day of life. There were 30 males and 21 females: 10 were twins, and there was one set of triplets. Their birth-weights ranged from 2 lb. 3 oz. to 5 lb. 8 oz.

Cases of hæmolytic disease due to blood-group incompatibility were excluded from both groups.

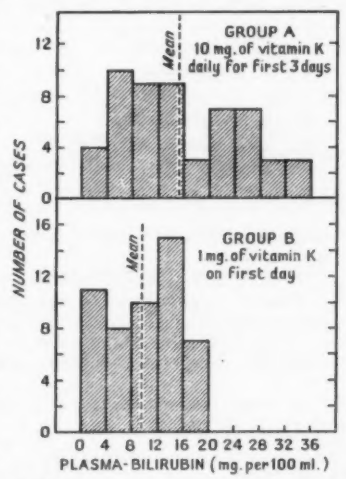
The two groups received the same routine care, apart from dosage of vitamin K.

Plasma-bilirubin levels were estimated in heparinised plasma by King's (1951) method. Blood was obtained by puncture of a femoral vein.

Results

The direct reaction with van den Bergh's reagent was negative in all the cases.

The distribution of the plasma-bilirubin levels in the two groups is shown in the accompanying figure. The mean level in group A was 15·4 mg. per 100 ml. and in group B 9·7 mg. per 100 ml. The difference between the means (5·7) is four times the standard error of the difference (1·44). Thus there is a significant difference between the two groups.


GROUP A
10 mg. of vitamin K daily for first 3 days
Mean
GROUP B
1 mg. of vitamin K on first day
Mean
NUMBER OF CASES
0 4 8 12 16 20 24 28 32 36
PLASMA-BILIRUBIN (mg. per 100 ml.)

Distribution of fifth-day plasma-bilirubin levels in premature babies according to dosage of vitamin K.

The accompanying table compares the number of babies with a plasma-bilirubin level of 18 mg. per 100 ml. or higher in each group as a whole and when sub-divided into standard birth-weight ranges. In group A the total is 21 of 55 (38%), whereas in group B it is 2 of 51 (4%). This difference is significant at the 0·1% level. Further, it will be seen that the difference between groups A and B is reflected in each birth-weight range.

There were 2 deaths from kernicterus in group A: one in a baby of birth-weight 3 lb. 10 oz. and with a fifth-day plasma-bilirubin level of 34 mg. per 100 ml.; and the other in a baby of birth-weight 4 lb. 7 oz. and with a plasma-bilirubin level of 22 mg. per 100 ml. 3 other babies had mild symptoms on the seventh day (lethargy and irritability when disturbed) which might have been due to kernicterus; their fifth-day plasma-bilirubin levels were 24·4, 27·8, and 33 mg. per 100 ml. All 3 infants appeared normal at the age of 1 year.

In group B there were no deaths and no baby developed symptoms suggesting kernicterus.

NUMBER OF PREMATURE BABIES WITH PLASMA-BILIRUBIN LEVELS OF 18 MG. PER 100 ML. OR HIGHER, ACCORDING TO WEIGHT AND DOSAGE OF VITAMIN K

Birth-weight	Group A (30 mg. vit. K)		Group B (1 mg. vit. K)	
	No. of cases	Plasma-bilirubin 18 mg. per 100 ml. or higher	No. of cases	Plasma-bilirubin 18 mg. per 100 ml. or higher
3 lb. 4 oz. or less	9	5 (55·5%)	10	1 (10·0%)
Over 3 lb. 4 oz. to 4 lb. 6 oz.	23	10 (43·5%)	15	0
Over 4 lb. 6 oz. to 5 lb. 8 oz.	23	6 (26·1%)	26	1 (3·8%)
Total..	55	21 (38·2%)	51	2 (3·9%)

Discussion

Premature babies tend to bleed in the first week of life (Smith 1954). It is usually advised that vitamin K be given to all premature babies after birth to prevent hypoprothrombinæmia, which is one factor producing the tendency to bleed. Large doses of the vitamin (up to a total of 90 mg.) have been used routinely in some centres.

The present results show that the dose of synkavit given to premature babies after birth affects the degree of hyperbilirubinæmia on the fifth day of life. The importance of this effect is shown by the fact that about 40% of the 55 infants given 30 mg. of synkavit had plasma-bilirubin levels of 18 mg. per 100 ml. or higher, and 2 died of kernicterus. In hæmolytic disease of the newborn a plasma-bilirubin level of 18 mg. per 100 ml. or higher is dangerous because of the possible development of kernicterus, and probably levels of this order are equally dangerous for all premature infants. Certainly we have seen a small area of bile-staining in the basal ganglia of a premature baby, not in this series, who died of an intercurrent illness and had a plasma-bilirubin level of 17·8 mg. per 100 ml. a few hours before death.

Only 2 of the babies given 1 mg. of synkavit had a plasma-bilirubin level of 18 mg. per 100 ml. or higher on the fifth day. One of these babies had a birth-weight of 4 lb. 12 oz., and usually the reduction in the plasma-bilirubin levels in babies given the smaller dose of synkavit has been less marked in those with a birth-weight over 4 lb. 6 oz. It must be remembered that fifth-day plasma-bilirubin levels are not necessarily maximal, and it is possible that a few babies given 1 mg. of synkavit had levels above 18 mg. per 100 ml. either shortly before or after the fifth day.

These findings indicate that a decrease in the incidence of kernicterus of prematurity could be anticipated if the practice of giving large doses of vitamin-K analogues to premature infants were abandoned. Since it has been shown that one dose of 0·5–1·0 mg. of vitamin K is as effective as larger doses in preventing postnatal hypoprothrombinæmia (Lehmann 1944), this dose might well be adopted universally for routine use.

We have not investigated the mode of action of vitamin K in increasing hyperbilirubinæmia. A reduced capacity of the liver to transform the indirect-reacting pigment, bilirubin, to direct-reacting bile pigment is thought to be the major cause of the hyperbilirubinæmia of newborn

infants (Billing et al. 1954). The action of large doses of vitamin-K analogues may be to increase hæmolysis (Allison 1955), or to reduce further the liver's capacity to handle bilirubin.

Summary

Premature babies given a total of 30 mg. of synkavit intramuscularly after birth showed a significantly greater hyperbilirubinæmia on the fifth day of life than those given a single injection of 1 mg.

It is suggested that routine use of the smaller dose would reduce the incidence of kernicterus of prematurity.

We wish to thank Dr. B. E. Schlesinger for permission to publish; Miss D. Walker for the bilirubin estimations; and Sister E. Edwards for her coöperation.

REFERENCES

Allison, A. C. (1955) *Lancet*, i, 669.
Billing, B. H., Cole, P. G., Lathe, G. H. (1954) *Brit. med. J.* ii, 1263.
King, E. J. (1951) Micro-Analysis in Medical Biochemistry. 2nd ed., London.
Laurance, B. (1955) *Lancet*, i, 819.
Lehmann, J. (1944) *Ibid*, i, 493.
Mollison, P. L., Cutbush, M. (1951) *Blood*, **6**, 777.
Smith, C. A. (1954) *In* Nelson, W. E. Textbook of Pediatrics. 6th ed., Philadelphia; p. 239.

BONE-MARROW IN ANKYLOSING SPONDYLITIS *

E. M. KINGSLEY PILLERS
M.A., M.D. Camb., D.C.H.
DAMON RUNYON RESEARCH FELLOW, DEPARTMENT OF RADIOTHERAPEUTICS, UNIVERSITY OF CAMBRIDGE

JOHN MARKS
M.A. Camb., M.D. Lond., M.R.C.P.
UNIVERSITY ASSISTANT PATHOLOGIST TO ADDENBROOKE'S HOSPITAL, CAMBRIDGE

PATIENTS with ankylosing spondylitis may be unusually susceptible to the development of leukæmia as a long-term effect after X-ray treatment to the spine (Court Brown and Abbatt 1955, van Swaay 1955); but we have not been able to find any published description of the bone-marrow in ankylosing spondylitis either before or after X-ray treatment. We therefore report here the bone-marrow findings in 18 patients before treatment and 10 patients after one or more courses of irradiation of the spine.

Methods

About 0·25 c.cm. of bone-marrow was aspirated with a Turkel needle from the manubrium sterni, and smears were made directly on to clean glass slides in the usual way and stained with Leishman's stain. Differential counts of 1000 cells were made on each specimen of bone-marrow.

Material and Results

28 patients were diagnosed as having ankylosing spondylitis, with typical clinical criteria and radiological findings, and all responded well to X-ray therapy. Their hæmoglobin was within normal limits except in case 7, who had mild anæmia (Hb 10·2 g. per 100 ml.). The clinical details, bone-marrow findings, and previous radiotherapy are shown in tables I and II. The erythrocyte-sedimentation rate (E.S.R.) (Wintrobe correction to 45% hæmatocrit) was also included when this investigation had been made. The cellularity of the bone-marrow smears, judged from the cell density of the stained specimens, was normal in 17 cases and hypercellular in 11. This increase in cellularity affected all the formed elements of the bone-marrow, and the myeloid and erythroid cells both showed normal maturation. Lymphocytes and megakaryocytes were present in normal proportions, and the myeloid/erythroid ratios were within normal limits. The only abnormalities detected were plasmacytosis and eosinophilia in some of the bone-marrow smears.

The results of the bone-marrow findings are summarised in table III, which shows that 10 patients had an increase in plasma cells and 4 had an increase in eosinophils in the bone-marrow.

* Part of this work was done with the help of a research grant to E. M. K. P. from the Medical Research Council.

TABLE I—BONE-MARROW FINDINGS IN ANKYLOSING SPONDYLITIS NOT TREATED BY IRRADIATION

Case no.	Age (yr.)	Sex	Yr. since 1st symptom	E.S.R.	Cellularity	Eosinophils (%)	Plasma cells (%)	Myeloid/erythroid ratio
1	27	M	3	..	H	6·1	0·9	8·1/1
2	38	M	5	..	C	14·6	1·0	3·7/1
3	49	M	2	35	C	3·5	0·8	5·1/1
4	52	M	5	29	H	3·3	0·2	3·2/1
5	24	M	3/4	18	C	3·8	1·5	2·4/1
6	27	M	4	1	C	2·3	1·1	4·1/1
7	44	M	3	32	H	1·0	2·1	2·6/1
8	47	M	20	22	C	2·5	0·7	2·4/1
9	30	F	4	7	C	3·0	1·4	4·2/1
10	30	M	1/2	4	C	2·1	1·3	4·9/1
11	27	M	4	29	H	4·0	1·7	5·4/1
12	42	M	14	37	C	12·7	3·8	3·5/1
13	38	M	2	21	H	5·1	2·7	2·0/1
14	59	M	7	39	C	3·7	0·9	4·2/1
15	38	M	14	24	C	3·6	2·2	3·7/1
16	61	M	5	20	C	1·5	3·5	5·0/1
17	42	M	15	25	C	8·4	1·6	4·6/1
18	47	M	4	33	H	2·1	3·4	2·8/1

TABLE III—SUMMARY OF BONE-MARROW FINDINGS

Group of patients	Plasma cells		Eosinophils	
	Normal	Increased	Normal	Increased
With previous X-ray therapy (table II)	6	4	9	1
With no previous X-ray therapy (table I)	12	6	15	3
Total	18	10	24	4

Discussion

Marrow hypercellularity was found in 5 of the 10 patients who had received previous X-ray treatment and in 6 out of 18 patients who had had no previous irradiation, and thus bears no relationship to previous radio-

TABLE II—BONE-MARROW FINDINGS IN ANKYLOSING SPONDYLITIS TREATED BY IRRADIATION

Case no.	Age (yr.)	Sex	Yr. since 1st symptom	Previous X-ray treatment. No. of courses and dates; skin dose given × no. of fields over spine and sacro-iliac joints. (220 kV)	E.S.R.	Cellularity	Eosinophils (%)	Plasma cells (%)	Myeloid/erythroid ratio
19	47	M	20	1, 1500r × 4, marrow at end of treatment	..	C	1·7	2·2	3·7/1
20	31	M	11	5, 1944–51, last 3 yr. ago, 1800r × 2; 900r; 600r; 300r × 2 (165 kV)	14	H	6·6	0·8	1·4/1
21	30	M	5	2, 1951–53, last 15/12 ago, 1400r × 4; 1000r × 1	..	C	3·5	2·0	5·1/1
22	41	M	1/2	1, 10/12 ago, 1500r × 4	40	H	12·9	2·3	3·5/1
23	36	M	12	1, in South Africa 11 yr. ago	18	H	3·0	1·1	6·6/1
24	27	M	2	1, 4/12 ago, 1500r × 3	..	C	2·6	0·3	3·0/1
25	41	M	7	3, 1944–51, last 7/12 ago, 2000r × 2; 2000r × 1; 1000r × 1	..	H	1·8	3·1	3·4/1
26	24	M	3/4	1, 4 yr. ago, 1800r × 2	25	C	2·0	0·9	4·5/1
27	39	M	7	3, 1949–52, last 10/12 ago, 1500r × 3; 1500r × 1; 1500r × 1	..	C	2·4	1·2	4·0/1
28	35	M	7	2, 1952–54, last 9/12 ago, 2000r × 3; 1200r × 2	..	H	4·0	1·5	4·0/1

therapy. The average myeloid/erythroid ratio was 3·9/1 in both the treated and untreated groups. Therefore in this series there is no evidence of stimulation of the bone-marrow by these dosages of radiation to the spine.

Plasmacytosis

The normal level of plasma cells in the bone-marrow was discussed by Hayhoe and Smith (1951), who reviewed the findings of several other workers and concluded that 2% or more was above the normal maximum.

In the 10 patients with an increase in plasma cells (2·0–3·8%) there seemed to be no relationship between the plasmacytosis and a history of previous irradiation. Of the 18 patients who had not been treated with X rays 6 showed plasmacytosis. Of the 6 patients who had received previous irradiation 4 showed plasmacytosis. Although, when investigated, the E.S.R. was raised in patients showing plasmacytosis, the converse was not true.

The plasmacytosis may be explained by some relationship between ankylosing spondylitis and rheumatoid arthritis. Hayhoe and Smith (1951) reported 10 consecutive cases of rheumatoid arthritis showing an increase in bone-marrow plasma cells, which was usually associated with an increase in the plasma-globulin fraction. The plasma-proteins, however, were not studied in the present patients with ankylosing spondylitis.

Eosinophilia

The normal level of eosinophils (both mature and precursor forms) in the bone-marrow was considered to be up to 7·5% (Whitby and Britton 1953).

Among the 4 patients with eosinophilia (8·4–14·6%) in the present series 1 had received X-ray therapy, but the 3 others had not. 2 of the patients with eosinophilia showed also plasmacytosis (1 had received X-ray therapy but the other had not).

Eosinophilia occurs in many diseases where there is a body reaction to foreign protein. In all 4 patients with eosinophilia the E.S.R. was raised.

Summary

28 bone-marrow examinations are reported from patients with ankylosing spondylitis.

The only significant abnormalities in the bone-marrow were plasmacytosis in 10 patients and eosinophilia in 4.

These findings could not be correlated with previous X-ray treatment.

We are grateful to Prof. J. S. Mitchell for advice and permission to publish.

REFERENCES

Court Brown, W. M., Abbatt, J. D. (1955) *Lancet*, i, 1283.
Hayhoe, F. G. J., Smith, D. R. (1951) *J. clin. Path.* **4**, 47.
van Swaay, H. (1955) *Lancet*, ii, 225.
Whitby, L. E. H., Britton, C. J. C. (1953) Disorders of the Blood. 7th ed., London; p. 11.

ORAL STREPTOMYCIN IN BACILLARY DYSENTERY

GEORGE SANGSTER
M.D. Aberd.
ASSISTANT PHYSICIAN,
CITY HOSPITAL FOR INFECTIOUS DISEASES, EDINBURGH

THE high prevalence of bacillary dysentery in the past fifteen years has apparently been uninfluenced by the introduction of chemotherapy and antibiotics; nevertheless, the prevention of spread of dysentery may be aided by the successful treatment of acute cases and carriers.

In recent years sulphonamides have produced fewer bacteriological cures in bacillary dysentery; this is generally held to be because resistant strains of shigellæ have appeared, and therefore the use of antibiotics must be considered seriously.

Zintel et al. (1945) showed that streptomycin administered orally produced a high concentration in the gut (particularly after four days' treatment) and that absorption was negligible. The earliest reports of its use in bacillary dysentery came from the United States, and good results were obtained by Hardy and Halbert (1948) in 37 cases of Flexner (Z) dysentery treated with 1 or 2 g. daily for three days. Ross et al. (1949) gave a longer course for an average of 10·7 days to 34 cases with results which compared favourably with those in a control group treated with sulphadiazine. In Shanghai, Chang and Su (1951) claimed a reduction in mortality from 14 to 4% using streptomycin; in their series of 110 cases they confirmed the rapid clinical response and the early disappearance of shigellæ from the stools, reported by the American workers.

There are few reports from this country, and no large series has been published. In a study of the sensitivity of *Shigella sonnei*, Forbes (1953) successfully treated 16 acute cases and 1 carrier with oral streptomycin; he gave 0·5 g. twice daily for two or three days with bacteriological cure in all cases, although in 1 case the fæces proved bacteriologically positive on the sixth day after treatment. 3 additional cases responded satisfactorily to streptomycin after sulphonamides and chloramphenicol had failed.

More recently Abbott and Parry (1955), comparing the efficacy of tetracycline, phthalylsulphathiazole, and oral streptomycin in Sonne dysentery, found that of 25 cases of all ages treated with streptomycin (0·5 g. twice daily for three days) only 9 (36%) were cured by one course. Similar results were obtained in the sulphonamide group, of which 34% of 32 cases were cured by a seven-day course, but a high degree of success (96% of 27 cases cured) was achieved with tetracycline, again with a seven-day course.

Previous Series

Of 200 consecutive patients (94% of whom were infected by *Sh. sonnei*) treated in the City Hospital, Edinburgh, in 1948–49 with a seven-day course of succinylsulphathiazole or phthalylsulphathiazole, or a combination of both drugs, all the 30 patients over 6 years old were cured by one course of treatment. But of the 170 patients who were under 6 years old, only 106 (62%) were cleared by one course; 38 (22%) were cleared after two courses, and a further 8 (5%) after three courses; the remaining 18 (11%) were ultimately given streptomycin orally (1 g. daily for five days) with good results, after four to six unsuccessful courses with several sulphonamides.

The satisfactory response in these 18 cases (they were essentially convalescent carriers, having had positive stools for twenty-nine to eighty-three days before streptomycin was started) prompted me to use streptomycin in acute cases. In 13 such cases, the clinical response was entirely satisfactory; symptoms subsided in two to three days and all fæces were bacteriologically negative for periods ranging from thirty to fifty-eight days after the end of the five-day course. I therefore decided to adopt this form of treatment routinely for children, and later I extended it to patients of all ages.

Present Series

The series comprises 1474 cases of proved bacillary dysentery treated with a five-day course of streptomycin at the City Hospital, Edinburgh, during the five years between November, 1949, and October, 1954. Cases of "clinical" dysentery and non-specific enterocolitis similarly treated are not included. Most of the patients (1177) had *Sh. sonnei* infections, and the remainder (297) had *Sh. flexneri* (type Z or X) infections; there were 1421 acute cases and 53 symptomless carriers. The patients' ages ranged from 5 days to 79 years; most of them were under 10 years of age.

TABLE I—RESULTS OF TREATING 1474 PATIENTS WITH ORAL STREPTOMYCIN

Age (yr.)	No. of cases	No. of cases cured with :			
		1 course	2 courses	2 courses plus chloramphenicol	2 courses plus oxytetracycline
0–1	155	122	24	4	5
1–2	340	282	47	1	10
2–3	272	229	37	1	5
3–4	166	145	19	0	2
4–5	135	121	11	0	3
5–6	70	62	6	1	1
	1138	961 (84·4%)	144 (12·6%)	7	26
Over 6	336	306 (91%)	25 (7·5%)	1	4
Total	1474	1267 (86%)	169 (11·5%)	8 (0·5%)	30 (2·0%)

4 patients (aged 5 weeks, 3 months, and 34 and 75 years) died within twenty-four hours of admission, and none of these received streptomycin. Dysentery was a contributory cause of death in 3 other cases, but in only 1 case was streptomycin used.

Streptomycin was given for five days in an unflavoured aqueous solution in equally divided doses at six-hourly intervals; patients younger than 10 years received 1 g. daily and patients older than 10, 2 g. daily. Treatment was started as soon as the stool was known to be bacteriologically positive, usually within thirty-six hours of the patient's admission. If the dysentery was severe or the diagnosis was almost certain on epidemiological grounds, treatment was started soon after admission and at least one specimen of fæces had been collected.

During the acute phase of the illness, the patient was given a fluid and light diet which was regulated according to age, general condition, and severity of the illness, and this was followed by a low-residue diet until discharge from hospital. Carriers received a normal diet. If more than one course of streptomycin (or any other antibiotic) was required, vitamin B_1 was added to the diet during the additional course and for a few days afterwards. In only 12 cases was intravenous fluid replacement necessary.

After treatment, the patients were kept under surveillance for a short period and were not discharged unless at least three consecutive bacteriological examinations of fæces in the week after treatment had proved negative. For patients returning to other hospitals, institutions, or nurseries, the minimum requirement was six consecutive negative examinations.

Results

Although no direct comparison is possible, table I shows that the results in the under-6 age-group, which accounts for more than three-quarters of the total number of cases, are an improvement on the previous sulphonamide series. Of the 1138 cases in this group, 961 (84·4%) were cured by one five-day course of streptomycin, whereas comparable success was obtained only after two seven-day courses of sulphonamide, when 84% of 170 cases were cured.

Table II shows how the results varied throughout the five-year period; the proportion of cures after one course of streptomycin dropped by about 10% in both age-groups during this period, but the results in 1953–54 were still better than those of the sulphonamide-treated series. Furthermore in 1953–54 a second course continued to cure most of the cases which were not bacteriologically cured after one course. This does not suggest that bacterial resistance is as formidable a problem as might be expected; indeed, the comparatively poor results in the under-6 age group in 1953–54 may well be due to the fact that a larger number of cases were dealt with in a shorter period (one year), leading to overcrowding of the dysentery wards and greater danger of reinfection. In a few instances, after apparent cure there was direct evidence of reinfection; patients had exacerbation of symptoms, shigellæ reappeared in the stools, and, more positive proof, strains of the organism were isolated which had not been present previously.

Effects of Treatment on Different Types of Shigellæ

Clinical distinction of the illnesses produced by the several types of shigellæ is well-nigh impossible, but, in this country at any rate, the more severe infections with greater constitutional upset and often meningism, are likely to be produced by *Sh. flexneri*. The clinical response to oral streptomycin was usually rapid irrespective of the type of organism, and indeed the results from the bacteriological viewpoint are equally satisfactory, as table III shows.

TABLE II—VARIATION IN RESULTS OF TREATMENT DURING THE FIVE-YEAR PERIOD 1949–54

Period	Age (yr.)	No. of cases	No. of cases cured by streptomycin with :		
			1 course	2 courses	2 courses plus C or O
1949–51 (2 yr.)	Under 6	418	371 (89%)	42 (10%)	5 (1%)
	Over 6	132	128 (97%)	3 (3%)	1 (1%)
1951–53 (2 yr.)	Under 6	243	209 (86%)	28 (11·5%)	6 (2·5%)
	Over 6	60	53 (89%)	7 (11%)	0
1953–54 (1 yr.)	Under 6	477	381 (80%)	74 (15·5%)	22 (4·5%)
	Over 6	144	125 (87%)	15 (10%)	4 (3%)
Total ..		1474	1267 (86%)	169 (11·5%)	38 (2·5%)

C = chloramphenicol. O = Oxytetracycline.

In the first two-year period (1949–51), there were few *Sh. flexneri* infections (5%). Thereafter there was a

TABLE III—EFFECT OF ORAL STREPTOMYCIN TREATMENT IN DIFFERENT TYPES OF INFECTION

Age (yr.)	Period	*Sh. sonnei* infections				*Sh. flexneri* infections				Total
		No. of cases	No. of cases cured with :			No. of cases	No. of cases cured with :			
			1 course	2 courses	2 courses plus C or O		1 course	2 courses	2 courses plus C or O	
Under 6	1949–51	399	355	40	4	19	16	2	1	418
	1951–53	180	158	17	5	63	51	11	1	243
	1953–54	328	257	52	19	149	124	22	3	477
	Total	907	770 (85%)	109 (11%)	28 (4%)	231	191 (82%)	35 (15%)	5 (3%)	1138
Over 6	1949–51	129	126	2	1	3	2	1	0	132
	1951–53	46	40	6	0	14	13	1	0	60
	1953–54	95	81	10	4	49	44	5	0	144
	Total	270	247 (91%)	18 (7%)	5 (2%)	66	59 (89%)	7 (11%)		336
Grand total		1177	1017 (86%)	127 (11%)	33 (3%)	297	250 (84%)	42 (14%)	5 (2%)	1474

C = chloramphenicol. O = oxytetracycline.

steady increase to approximately 25% in 1951–53, and by 1954 the proportion had risen to almost a third. This increase was not responsible for the poorer results obtained latterly (table II) because, although the over-all

TABLE IV—RESULTS OF TREATMENT WITH ORAL STREPTOMYCIN OR PHTHALYLSULPHACETAMIDE

Drug	No. of cases	No. of cases cured with: 1 course	2 courses	2 courses plus oxy-tetra-cycline	*Sh. sonnei*	*Sh. flexneri*
Streptomycin ..	102	87	10	5	71	31
Phthalylsulphaceta-mide	102	53	28	21	73	29
Total	204	140	38	26	144	60

Flexner figures are slightly lower in the under-6 age-group, the chances of success after one course are more or less equal—i.e., 4 out of 5 cases were cured, irrespective of the type of organism.

A Further Sulphonamide Trial

During 1953, sulphonamide was given a further trial. Half the patients were given phthalylsulphacetamide ('Enterocid') in the recommended dosage for five days and half were given streptomycin (1 or 2 g. according to age) for four days; all cases were treated as far as possible under similar conditions and the test of cure described above was employed. Both groups were comparable as regards age and duration of symptoms. The results are summarised in table IV.

Better results might have been obtained with phthalylsulphacetamide if a longer course (seven days are recommended) and perhaps larger doses had been given. Nevertheless it was clear that the sulphonamide results, which were similar to those obtained in 1948–49, did not compare favourably with those of the oral streptomycin group. Although the four-day course of streptomycin was as effective as the five-day course at that time, it was decided to continue with the latter to provide suitable comparison through the years.

Discussion

The choice of dosage and duration of the course of oral streptomycin was influenced to a large extent by the experimental work of Zintel et al. (1945), who suggested that 1 g. of oral streptomycin daily would give a maximum concentration of streptomycin in the lower bowel of a healthy subject after four days. Because the calculation of an optimum dose for each case was impossible owing to many variable and unpredictable factors and the absence of accurate fæcal estimations of streptomycin, I felt that a fixed amount, perhaps excessive in some cases, would be best, particularly as the effect of the streptomycin was almost entirely local. Although the tests of cure in this series are not ideal, they were satisfactory in practice; in most cases which were still infected, confirmation was obtained from the first three clearance specimens.

Forbes (1953) showed that, in vitro, streptomycin kills *Sh. sonnei* in lower concentrations than aureomycin, chloramphenicol, or oxytetracycline, but that *Sh. sonnei* acquires resistance to streptomycin earlier than to the others. While this suggests that a short course of treatment is advisable, the speed of bacteriological cure is likely to be affected by the extent of the disease in the lower bowel and the accessibility of the organisms. The five-day course was considered sufficiently short to reduce the risk of resistance to negligible proportions; but, as a further precaution, if no sensitivity test had been done the course was repeated once only when indicated. If the second course was unsuccessful, another antibiotic (chloramphenicol or oxytetracycline) was given—with satisfactory results in all but a few cases. Although the proportion of cases in the under-6 age-group requiring more than one course of streptomycin increased from 11 to 20% during the survey, at least 95% of cases were cured by two courses throughout the five-year period (table II). This high degree of success attained by a second course does not suggest that the shigellæ soon acquire resistance, but possibly in time this disadvantage will become more apparent.

There were no toxic effects of the treatment; a few infants had a mild dermatitis in the napkin area, which may have been produced or aggravated by the streptomycin, but this subsided within a few days after the treatment was stopped.

The results were equally satisfactory in acute cases, irrespective of the duration of illness before treatment, and in carriers. Moreover, the rapid control of symptoms (particularly diarrhœa) probably to some extent reduced the risks of auto-infection and cross-infection. A further benefit, of considerable importance to the patient as well as to the hospital, was the reduction of the patient's stay in hospital; this led to a considerable saving of time and beds. Initially the cost of streptomycin treatment was relatively high, but this was offset by the advantages of a quicker turnover, and, with ever-falling prices, streptomycin can now be used economically on a wide scale.

It seems that streptomycin, administered orally, is useful and safe in the treatment of bacillary dysentery, and is to be preferred to sulphonamide. That bacterial resistance will in time render it less effective is distinctly possible, but at present there is no strong indication for the routine use of newer antibiotics, some of which may have certain disadvantages.

Summary

In 1949–54, 1474 cases of proved bacillary dysentery were treated with a five-day course of streptomycin. Although the percentage of first-time cures fell over the five years, the results in 1954 were still better than those previously obtained with sulphonamides; at least 80% of cases were cured by one course and 95% by two courses.

A small trial (204 cases) in which phthalylsulphacetamide and streptomycin were compared showed that streptomycin was more effective and that the sulphonamide results were similar to those obtained before streptomycin was used.

Oral streptomycin proved highly effective in clearing carriers who had been treated unsuccessfully with sulphonamide, as well as in acute cases.

It is safe, reliable, and economical, but in time drug resistance may render it less effective.

I am indebted to Dr. A. Joe, medical superintendent of the City Hospital, Edinburgh, for his support in this investigation. The initial supply of 'Enterocid' was kindly provided by British Schering Ltd.

REFERENCES

Abbott, J. D., Parry, H. E. (1955) *Lancet*, **i**, 16.

Chang, S. Y., Su, T. F. (1951) *J. Pediat.* **38**, 602.

Forbes, G. B. (1953) *Brit. med. J.* **i**, 1139.

Hardy, A. V., Halbert, S. P. (1948) *Publ. Hlth Rep., Wash.* **63**, 790.

Ross, S., Burke, F. G., Rice, E. C., Bischoff, H., Washington, J. A. (1949) *J. Amer. med. Ass.* **141**, 183.

Zintel, H. A., Flippin, H. F., Nichols, A. C., Wiley, M. M., Rhoads, J. E. (1945) *Amer. J. med. Sci.* **210**, 421.

RAPID TEST FOR HEPATOLENTICULAR DEGENERATION

H. A. RAVIN
M.D. Harvard

RESEARCH FELLOW OF THE NATIONAL FOUNDATION FOR INFANTILE PARALYSIS

From the Department of Biochemical Research, Institute of Neurology, Queen Square, London

THE definitive diagnosis of hepatolenticular degeneration (Wilson's disease) rests upon the demonstration of the following specific biochemical or metabolic abnormalities: increased urinary excretion of copper (Cumings 1951) and amino-acids (Uzman and Denny-Brown 1948), a low serum-copper level (Cumings et al. 1955), a low serum-cæruloplasmin level (Scheinberg and Gitlin 1952), and low serum-copper-oxidase activity (Bearn and Kunkel 1952).

These determinations are so tedious, exacting, or costly that they are generally made only in special neurological or research centres and even then are usually reserved for cases where clinical suspicion is high. As a result the correct diagnosis of hepatolenticular degeneration is often deferred for many months, until the inexorable progression of signs and symptoms makes the diagnosis clear on clinical grounds alone. This is far too late for optimal results of therapy, however, since copper-complexing agents cannot be expected to reverse well-established functional deficits, although they may arrest or significantly retard the progression of this disease.

Of the several characteristic biochemical findings in hepatolenticular degeneration the most consistently abnormal result, with the least overlap into the range of normal values, is the considerable decrease of serum-copper-oxidase activity (Bearn and Kunkel 1952). Apart from hepatolenticular degeneration, only an occasional case of frank nephrosis is associated with abnormally low serum-copper-oxidase activity (Markowitz et al. 1955). A simple, rapid, and accurate colorimetric estimation of this enzymatic activity, requiring only standard laboratory equipment, is briefly outlined here.

Reagents

Commercial paraphenylene diamine is dissolved in acetone and converted to a salt by adding concentrated hydrochloric acid drop by drop until no further precipitate forms. The precipitate is collected on filter-paper, washed with either dry acetone or ether, and dried in a desiccator. A 0·5% stock solution of paraphenylene diamine hydrochloride is prepared for use in the test and should be stored in a stoppered container in the cold (4°C). An increasing brown colour of the stock solution indicates deterioration, but the stock solution can be safely stored for about a week under the conditions described.

0·1 *N* acetate buffer (pH 6·0) is prepared by adding 10 ml. of 0·1 *N* acetic acid to 200 ml. of 0·1 *N* sodium acetate and is stored in the cold (4°C).

A 0·1% solution of sodium azide is prepared as a stock solution to stop the enzymatic reaction at the desired time. This solution requires no special storage and keeps indefinitely.

A 3% solution of sodium chloride is used as the diluent of the reaction mixture for measuring colour density, to prevent the turbidity attendant on dilution of serum with water.

Fresh serum, free from hæmolysis and turbidity, is preferable for accurate results; but a minimal degree of hæmolysis or slight turbidity may be tolerated, and the serum-paraphenylene-diamine-oxidase activity remains intact for at least two weeks at 4°C.

Method

All the determinations are made in duplicate. The reagents are warmed to room-temperature (25–27°C) before use.

0·1 ml. of serum is transferred accurately into the bottom of a 15-ml.-capacity test-tube with a blood pipette. 1 ml. of the 0·5% paraphenylene-diamine stock solution and 2 ml. of 0·1 *N* acetate buffer are added. A control for non-enzymatic oxidation is prepared at the same time in the very same way (including 0·1 ml. of serum) but with the further addition of 1 ml. of the 0·1% sodium-azide solution to inhibit enzymatic activity. The test-tubes are shaken for a moment to mix the reagents and immersed in a water-bath at 37°C. After an hour's incubation the test-tubes are removed, and 1 ml. of 0·1% sodium azide is added immediately to stop enzymatic activity, with a brief shaking to mix the reagents.

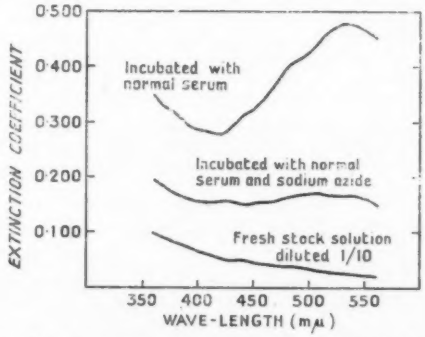


Fig. 1—Absorption spectra of solutions of paraphenylene diamine.

The colour density should be estimated within the first hour or two after completion of the incubation, because non-enzymatic oxidation of the substrate leads to gradual darkening of the solution. The reaction mixture is diluted to 10·1 ml., for quantitative estimation of colour density, by the addition of 6 ml. of 3% NaCl stock solution. The saline-diluted solutions are analysed at 530 mμ (see fig. 1 for absorption spectrum) in cuvettes of 10 mm. optical path, with the sodium-azide inhibited control set at zero extinction.

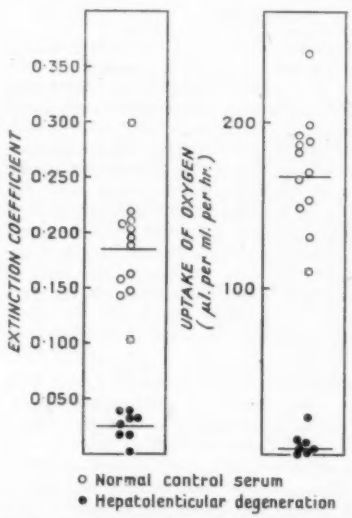


Fig. 2—Colorimetric and manometric measurements of copper-oxidase activity made in parallel on same samples of serum.

Results

The paraphenylene-diamine-oxidase activity of serum is most readily expressed as the extinction coefficient of the diluted reaction mixture prepared and analysed under the standard conditions described above. Extinction readings and oxygen uptake obtained in 8 cases of hepatolenticular degeneration and in 14 unselected control sera

are presented in fig. 2. Normal serum produces a dark lavender colour, whereas the serum in hepatolenticular degeneration produces a pale flesh colour. The difference is so striking as to be recognised at a glance.

Comment

The sequence of development of the characteristic biochemical abnormalities of hepatolenticular degeneration is unknown. In several reported series the lowered serum-copper-oxidase activity presented the most consistent and striking abnormality (Bearn and Kunkel 1952, Cumings et al. 1955, Markowitz et al. 1955). The lowered serum-copper-oxidase activity may be the most firmly established biochemical defect by reason of having been present longest—i.e., the initial manifestation of hepatolenticular degeneration. Reasoning on different grounds has led others (Bearn 1953, Scheinberg and Gitlin 1952) to suggest that deficient synthesis of cæruloplasmin (copper-oxidase) might be the primary defect. If this hypothesis is correct, the use of this simple and inexpensive colorimetric technique in screening patients with obscure disease of basal ganglia or of the liver should detect those with incipient hepatolenticular degeneration far earlier than is at present practicable.

It is not known whether the enzyme deficiency of the serum is always present from birth or has a gradual or abrupt onset before the development of clinical manifestations. If the latter, a normal or near-normal oxidase activity could conceivably be found in someone who subsequently develops hepatolenticular degeneration. Therefore, until evidence has accumulated on this point, it would be unwise to discount the possibility of early hepatolenticular degeneration on the basis of a single normal determination.

Summary

A simple colorimetric technique is described for the estimation of serum-paraphenylene-diamine-oxidase.

Application of this test in cases of obscure liver or brain dysfunction may lead to the detection of early hepatolenticular degeneration and to earlier and more effective therapy.

REFERENCES

Bearn, A. G. (1953) *Amer. J. Med.* **15**, 442.
— Kunkel, H. G. (1952) *J. clin. Invest.* **31**, 616.
Cumings, J. N. (1951) *Brain*, **74**, 10.
— Goodwin, H. J., Earl, C. J. (1955) *J. clin. Path.* **8**, 69.
Markowitz, H., Gubler, C. J., Mahoney, J. P., Cartwright, G. E., Wintrobe, M. M. (1955) *J. clin. Invest.* **34**, 1498.
Scheinberg, I. H., Gitlin, D. (1952) *Science*, **116**, 484.
Uzman, L., Denny-Brown, D. (1948) *Amer. J. med. Sci.* **215**, 599.

VITAMIN-B_{12} DEFICIENCY DUE TO DEFECTIVE DIET

R. J. HARRISON
M.R.C.P.
PHYSICIAN, ST. JAMES' HOSPITAL, LONDON

C. C. BOOTH
M.B. St. And., M.R.C.P.
MEDICAL REGISTRAR AND TUTOR

D. L. MOLLIN
B.Sc., M.B. Wales
LECTURER IN PATHOLOGY (HÆMATOLOGY)

POSTGRADUATE MEDICAL SCHOOL OF LONDON

IT is now recognised that there is a deficiency of vitamin B_{12} in addisonian pernicious anæmia (Berk et al. 1948). A similar deficiency may develop in patients who have undergone gastric operations (*Lancet* 1955) or who have intestinal anastomoses, strictures, or blind loops (Mollin and Ross 1954). It has also been described in about a third of the patients with a megaloblastic anæmia associated with "idiopathic steatorrhœa" (Mollin and Ross 1954).

Vitamin-B_{12} deficiency due to an inadequate intake of the vitamin is much rarer, at least in temperate zones. Megaloblastic anæmia and neurological lesions responding to treatment with vitamin B_{12} have occasionally been observed in people who take a strictly vegetarian diet, from which all animal protein, including dairy produce, has been excluded (A. G. Badenoch 1952, J. Badenoch 1954); in such persons low serum concentrations of vitamin B_{12} have been recorded (Mollin and Ross 1954, Wokes et al. 1955).

This paper records details of a patient who was not a true vegetarian, but who had a megaloblastic anæmia associated with B_{12} deficiency which was due to inadequate intake of vitamin B_{12} in the diet.

Methods

Hæmatological methods were those described by Dacie (1950).

Serum-vitamin-B_{12} assays were made with *Euglena gracilis* var *bacillaris*, using the method described by Ross (1952).

Gastric biopsies were carried out using the tube designed by Wood et al. (1949).

Fat balances were carried out over a continuous nine-day period. The patient was given a diet containing 50 g. of fat daily. After four days on this diet all stools were collected for five days and the fat content estimated.

Absorption of vitamin B_{12} was estimated by determining the excretion of radioactivity in the fæces after the oral administration of a test dose of radioactive B_{12} labelled with cobalt 58. Details of the method employed have already been given (Bradley et al. 1954, Baker and Mollin 1955).

Case-report

An old-age pensioner aged 77 was admitted to hospital on Nov. 6, 1954, complaining of weakness and fatigue of three months' duration and of increasing swelling of her legs for one month.

History

In 1919 she had a gastro-enterostomy for relief of a duodenal ulcer. After the operation pain persisted and she severely restricted her diet. Since 1943 she had existed on a diet of bread and margarine, tea, and potatoes. She had taken no meat or fish, and her only available source of animal protein was the small amount of milk with which she flavoured her tea. For a year before her admission to hospital she had taken orange juice daily. For many years she had taken about 2 oz. of Glauber's salt daily and she passed about five or six watery motions a day. For ten years she had suffered from distressing prolapse of the rectum. There was no history of anæmia in her family.

Examination

She was a thin poorly nourished woman (height 5 ft. 3 in., weight 6 st. 1 lb.) and she was too weak to stand. She was obviously anæmic. The skin was sallow but not icteric. There was no finger-clubbing, koilonychia, or purpura. Her tongue was pale but there was no atrophy or glossitis. There was moderate pitting œdema of the feet. Pulse regular, 72 per min. Blood-pressure 100/70 mm. Hg. Jugular venous pressure not raised. No cardiac enlargement. Soft apical systolic murmur. Respiratory system normal. Old healed operation scar on the abdomen. Liver and spleen not palpable. Cranial nerves normal. No weakness or wasting. Tendon reflexes present and equal. Plantar responses flexor. No sensory impairment.

Investigations

Blood picture.—Red cells 1,200,000 per c.mm. Hæmoglobin 5·4 g. per 100 ml. Packed-cell volume 18%. Reticulocytes 2%. Mean corpuscular volume 150 cμ. Mean corpuscular hæmoglobin concentration 30%. Leucocytes 5000 per c.mm. Stained blood-smears showed macrocytosis and marked anisocytosis and poikilocytosis. Sternal marrow biopsy showed moderately severe megaloblastic change. Serum-B_{12} concentration was 75 μμg. per ml. (normal range 100–900 μμg. per ml.).

Barium meal.—The œsophagus was normal. The barium passed immediately through the stoma of the gastro-enterostomy into the jejunum and also, less rapidly, through the pyloric end of the stomach into the duodenum and afferent limb. The afferent limb was short and peristalsis was satisfactory. The stoma functioned well and no ulcer was seen.

Gastric secretion.—Histamine-fast achlorhydria was shown on two occasions.

Gastric biopsy.—Three fragments were obtained at biopsy. Dr. I. Doniach reported: "There was moderate reduction in the thickness of the gastric mucosa. Though in some parts specialised cells were partly replaced by mucous neck cells,

a fair number of pepsinogen and oxyntic cells were present. The mucosa was infiltrated throughout with lymphocytes and plasma-cells, and occasional eosinophil and neutrophil leucocytes. The picture was that of an atrophic gastritis of moderate severity, with survival of a fair number of specialised cells."

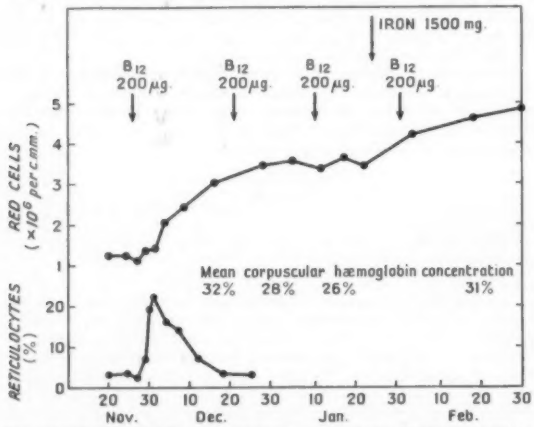
Fat balance.—Normal: 92% of the ingested fat was absorbed.

Absorption of radioactive B_{12}.—The patient absorbed 0·35 μg. ^{58}Co-labelled B_{12} from an oral dose of 0·6 μg. given alone, and 0·39 μg. from the same oral dose given fifteen minutes after the subcutaneous injection of 0·25 mg. carbachol (carbamylcholine chloride). Similar amounts are absorbed by normal subjects (Mollin and Baker 1955).

Blood-urea was 32 mg. per 100 ml.: and *serum-proteins* 4·5 g. per 100 ml. (albumin 3·1 g., globulin 1·4 g.).

Response to Treatment

The patient received an intramuscular injection of 200 μg. vitamin B_{12} initially, and this was repeated on the 24th, 44th, and 75th days afterwards. The response to this treatment is shown in the accompanying figure. Three weeks after the first



The red-cell and reticulocyte response to treatment with intramuscular vitamin B_{12} and intravenous iron. 200 μg. of vitamin B_{12} was given intramuscularly on each of the four occasions indicated.

injection, the blood-count showed signs of iron deficiency. A course of 1500 mg. saccharated iron was given intravenously. The blood picture two months later was essentially normal (red cells 4,800,000 per c.mm., hæmoglobin 14·0 g. per 100 ml., and P.C.V. 46%).

On admission to hospital on Nov. 6 she ceased taking Glauber's salt but continued to pass four or five watery stools daily. Four days after the first injection of vitamin B_{12}, the bowel action was normal. Two weeks later her appetite had improved to the extent that she was able to take a full ward diet. Her weight increased steadily and two and a half months after admission to hospital she had gained 1 st. 4 lb. The prolapse of her rectum was subsequently corrected surgically.

Comment

These results indicate that the megaloblastic anæmia in this patient was due to vitamin-B_{12} deficiency; for her pretreatment serum-B_{12} concentration was low and her anæmia responded to treatment with B_{12}. Deficiency of this vitamin may develop in patients after gastro-enterostomy who are taking an adequate diet (Mollin and Ross 1954). In these patients a blind antiperistaltic loop is usually present (Naish and Capper 1953). Such patients often have steatorrhœa and they are unable to absorb test doses of labelled B_{12}, excreting all or almost all of an oral dose of radioactive B_{12} in the fæces (Booth and Mollin 1955). In our patient, the gastro-enterostomy functioned well, there was no steatorrhœa, and she was able to absorb normal amounts of test doses of labelled vitamin B_{12}. This finding indicated that she had no intestinal lesion interfering with her ability to absorb vitamin B_{12}. It also indicated that the patient was able to secrete normal amounts of intrinsic factor and was therefore not suffering from addisonian pernicious anæmia. This was borne out by the gastric biopsy which did not show the gastric atrophy usually associated with this disorder.

It is therefore clear that the deficiency of vitamin B_{12} in this patient was due to an inadequate dietary intake of the vitamin. The patient's diet was, and had been for many years, grossly deficient in foods containing vitamin B_{12}, her sole source of vitamin B_{12} being her small daily allowance of milk, which did not exceed 200 ml. per day; this is approximately equivalent to an intake of 0·4 μg. of vitamin B_{12} (Gregory 1954). This proved to be quite inadequate to supply her requirements of this vitamin. It seems unlikely that the constant intake of Glauber's salt interfered with intestinal absorption.

Summary

A woman of 77 had lived on bread and margarine, tea, and potatoes for more than ten years. She was found to have a megaloblastic anæmia which responded to vitamin B_{12}. The B_{12} deficiency was due to the inadequate intake in the diet.

REFERENCES

Badenoch, A. G. (1952) *Brit. med. J.* ii, 668.
Badenoch, J. (1954) *Proc. R. Soc. Med.* **47**, 426.
Baker, S. J., Mollin, D. L. (1955) *Brit. J. Hæmatol.* **1**, 46.
Berk, L., Castle, W. B., Welch, A. D., Heinle, R. W., Anker, R., Epstein, M. (1948) *New Engl. J. Med.* **239**, 911.
Booth, C. C., Mollin, D. L. (1955) Unpublished observations.
Bradley, J. E., Lester Smith, E., Baker, S. J., Mollin, D. L. (1954) *Lancet*, ii, 476.
Dacie, J. V. (1950) Practical Hæmatology. London.
Gregory, M. E. (1954) *Brit. J. Nutr.* **8**, 340.
Lancet (1955) ii, 73.
Mollin, D. L., Baker, S. J. (1955) Biochemical Society Symposium: The Biochemistry of Vitamin B_{12}. London.
— Ross, G. I. M. (1954) *Proc. R. Soc. Med.* **47**, 428.
Naish, J., Capper, W. M. (1953) *Lancet*, ii, 597.
Ross, G. I. M. (1952) *J. clin. Path.* **5**, 250.
Wokes, F., Badenoch, J., Sinclair, H. M. (1955) *Foeding*, **16**, 590.
Wood, J., Doig, R. K., Motteram, R., Hughes, A. (1949) *Lancet*, i, 18.

Preliminary Communication

IRRADIATION OF PITUITARY FOR ADVANCED MAMMARY CANCER

In a series of 80 bilateral adrenalectomies for cancer of the breast, despite the most careful preoperative and postoperative treatment we have found that this operation carries a mortality of 6%. This figure is comparable with those reported by Huggins [1] and Cade.[2]

We do not consider that adrenalectomy is justifiable unless it gives a clear remission of the disease with complete alleviation of pain for at least a year. In our series such remission has only been obtained in 35% of cases.

Hypophysectomy, while giving a greater proportion of successful results (probably 50%), still subjects the seriously ill patient to a major operation with a mortality of approximately 5%. For these reasons an attempt has been made to find a safe procedure which would not add further to the patient's suffering, and which would at the same time be of value in the treatment of advanced cancer of the breast.

At this hospital we have tried to destroy the pituitary gland completely by implanting unscreened radioactive gold. Unlike other workers we have relied on smaller and, if necessary, repeated doses of β-irradiation. The gold seeds are implanted in the anterior part of the pituitary gland through a fairly small-bore needle which is introduced into the sella turcica via the nose and sphenoidal sinus. Extremely accurate visual localisation of the sella turcica is obtained by means of an image intensifier working in two planes, and only the most accurate positioning of the gold grains is accepted.

During the past eighteen months 50 patients have been treated in this way with full biochemical and

1. Huggins, C., Bergenstal, D. M. *J. Amer. med. Ass.* 1951, **147**, 101. Huggins, C., Dao, T. L. Y. *Ibid*, 1953, **151**, 1388.
2. Cade, S. *Ann. R. Coll. Surg. Engl.* 1954, **15**, 71. Cade, S. *Brit. med. J.* 1955, i, 1.

pathological investigation. In this consecutive series there has been no mortality or complications, even though many of the patients were unfit for adrenalectomy. No evidence of any damage to the optic chiasma has been found. (In 2 cases with choroidal metastases vision has improved.) 1 patient, who has been in remission for a year, has a unilateral sixth-nerve palsy, the cause of which is as yet undetermined. There has not been a case of basal meningitis, or of cerebrospinal rhinorrhœa following this procedure.

Further careful assessment and follow-up of these cases is essential before any firm conclusion is reached, but apparently this method of accurate implantation and controlled dosage may prove a safe additional palliative measure in advanced carcinoma of the breast.

Royal Marsden Hospital, London

W. P. GREENING F.R.C.S.

New Inventions

AN ARTICULATING ENTEROTOME

SINCE Paul first modestly described his method of colectomy with the formation of a spur in 1895, his operation has continued to be used by surgeons all over the world. In a bad risk case, or where, for a technical reason, colectomy with end-to-end anastomosis is dangerous, Paul's operation still offers a safe method of resection and approximation of the colon.

When restoration of continuity becomes necessary, various devices have been used. Some surgeons prefer formal end-to-end anastomosis, others use various techniques for destroying the spur. The success of the second stage of this operation depends on efficient destruction of the spur between the two loops, and numerous methods and instruments have been used to achieve this. Paul applied a pair of long dressing-forceps, tying the handles together with rubber tubing. Many kinds of enterotome have been used, including one devised by Dupuytren. All the instruments used for this purpose suffer from some defect, and it is difficult to devise one which is satisfactory in all respects. There are certain important points, however, which must be fulfilled if an enterotome is to be efficient:

(1) The blades must be sufficiently long to crush the whole spur, even in a patient with a fat abdominal wall.

(2) The blades should move parallel to one another and not, for example, as the blades of a pair of scissors; otherwise there is a tendency for the instrument to slip off, and for the deepest part of the spur to be uncrushed.

(3) The tips of the blades should meet first, though not so soon that they bite through the spur at the first tightening.

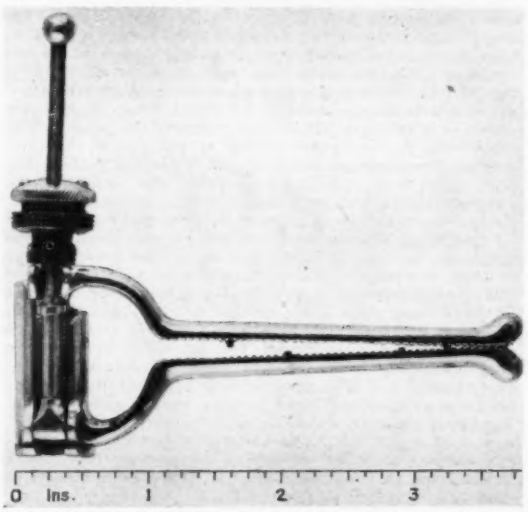


Fig. 1.

Fig. 2.

(4) There should be studs on the blades to stop them from slipping.

(5) The enterotome, when locked into place, should lie flush and snug against the abdominal wall.

(6) There must be a screw device which will approximate the blades and later separate them.

(7) If possible, the blades should be detachable one from the other, so that, when the colostomy lies awkwardly, each blade can be separately introduced into each loop of the colostomy and articulated when in position. They may then be screwed up tight.

I have used the instrument described below for five years and can honestly say that, on the whole, it has given satisfaction and does crush the spur right down to its base.

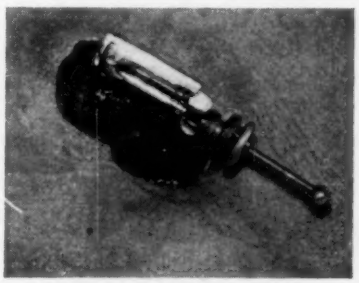


Fig. 3.

The instrument (fig. 1) which is of stainless steel, consists of two serrated blades which "dovetail" like the blades of a pair of artery forceps. The female blade carries a hinged arm, which, when the male blade is slid into position, locks the blades together by means of a collar and knurled nut. The nut both approximates and (most important) separates the blades; it is double because a single nut tends to become unscrewed. The over-all length of the instrument is 4 inches; the blades are 3 inches long and $^1/_4$ inch wide. Each blade is studded to prevent slipping. The instrument is bowed outwards above each blade because, if the spur is crushed in its whole extent, there is a danger that the instrument may fall inside the bowel. Each blade is separately introduced (fig. 2), and, when in position, as may be ascertained by passing a finger down alongside the blade, the two blades are locked together and screwed home. When the instrument is articulated and in place (fig. 3) it lies fairly flat against the abdominal wall and does not protrude, and so does not tend to move as the patient moves. It is important to lock the blades fairly tightly on the first occasion, and they should be tightened at intervals until they can be tightened no further.

The Lloyd-Davies-Bond enterotome incorporates most of the features set out above, but the instrument described here can be disarticulated to enable the blades to be applied separately and then reassembled easily.

I wish to thank Mr. Paul Dawson-Edwards for advice; Mr. W. Hanke, of Brierley Hill, Staffs, who made the prototype: Mr. W. E. Smith, instrument mechanic of the Queen Elizabeth Hospital, Birmingham, who modified it; and Messrs. A. L. Hawkins & Co. Ltd., 15, New Cavendish Street, London, W.1, who have made the existing instrument for me.

Queen Elizabeth Hospital, Birmingham

A. GOUREVITCH M.C., M.B. Birm., F.R.C.S.

Reviews of Books

World Population and Resources

A report by Political and Economic Planning. London: P.E.P. Distributed by Allen & Unwin. 1955. Pp. 339. 30s.

ACCORDING to the latest figures, since 1930 the world's population has risen by a third. Can this increasing population be supplied with adequate food, fuel, and raw materials? Can the less fortunate of those now living be brought up to a decent minimum standard? Can the hopes of advanced countries for still higher standards be satisfied? Can the 30 million or so people added each year to world population be supplied with all their requirements? Can all these things be done together and can they be done soon? In particular, how nearly attainable is a balance between world population and world resources? And if attainable, how can it be maintained? It is the aim of P.E.P. (Political and Economic Planning) to "study problems of public concern, to find out the facts, to present them impartially, and to suggest ways in which knowledge can be applied;" and the organisation has produced an admirable report on these formidable questions.

While much is being done and more can be done to increase the world's supply of foods, materials, and resources, there is obviously a limit to their production. Unless some holocaust befalls or unless effective measures are applied to limit population, it will go on increasing for some time at least, and probably at a progressively more rapid rate. Few people view with anything but horror the prospect of a third world war, yet there can be no doubt that "population pressure" is one of the main factors that lead to war. The problems of world population and resources must therefore be an urgent concern of all; and the report is intended particularly to provide the factual, quantitative basis for frank discussion of the problem. It demands the special attention of the medical profession, whose triumphs over disease have led to an increasing measure of death control and an upsurge in population. One of the report's main points is that in future death control should not be pressed on in isolation but should go hand in hand with birth-control. "If . . . programmes of death control and of economic development are to be thrust upon the people of underdeveloped countries, these peoples must be given corresponding opportunity to catch up with advanced Western countries in birth-control." "A major challenge to science is the supreme importance of finding a simple, generally acceptable, and low cost method of birth-control suitable for use by illiterates in difficult climatic or social conditions."

There are many difficult aspects to these problems, not the least of which is the attitude of religious bodies. Many of these issues are boldly tackled in the report, and on the religious question some recent words of the Pope are quoted: "The Church is not unaware of these problems; she is not indifferent to their anguishing aspects. . . . We urge Catholics to take an active part in the research and in the efforts which are made in this domain."

Keratoplasty

R. TOWNLEY PATON, M.D., F.A.C.S., surgeon director, Manhattan Eye, Ear, and Throat Hospital. New York and London: McGraw-Hill Book Co. 1955. Pp. 270. £10 14s.

IT is fitting at this time that a surgeon of such international repute as Dr. R. Townley Paton should write a comprehensive book on keratoplasty; for, particularly during the past two decades, enthusiasm and interest in indications and contra-indications for this operation and in a variety of surgical techniques has become considerable. To this difficult task Dr. Paton has brought his valuable and large experience as a surgeon, a director of research, a clinical professor of ophthalmology, and an administrator of the eye bank, a superb organisation to which many patients and surgeons owe much.

The book is admirably written, and the author describes lucidly and thoroughly the surgical techniques which he has found most practicable and effective. The procedures used by other surgeons are discussed and the vast literature is judiciously reviewed and sifted. Throughout the work, Dr. Paton has kept a fine balance between the scientific and clinical aspects, and has clearly shown where these are complementary to each other.

There are 29 excellent colour plates as well as half-tone photographs; and the drawings of the author's operations are well executed by Miss Daisy Stilwell.

Die endogenen Psychosen

das delphische Orakel der Psychiatrie. KURT KOLLE, professor of psychiatry and neurology in the University of Munich. Munich: Lehmanns. 1955. Pp. 48. DM. 3.50.

THIS oration was delivered in memory of Emil Kraepelin by the present professor of psychiatry in Munich on the fiftieth anniversary of the opening of the clinic with Kraepelin as its director. Professor Kolle is vehement in his opposition to current trends in psychiatry: he belongs to the old school and demands more direct and convincing evidence before he will approve psycho-analytic interpretations or accept the claims made for psychotherapy by some and for insulin by others in the treatment of schizophrenia. The psychogenesis of affective psychoses is no more plausible to him than it was to Kraepelin; and even Kretschmer goes further than Kolle will follow. There is, of course much for the sceptic to gird against in modern psychiatry, but Professor Kolle seems to be certain that, with few exceptions, what we know of this subject is no more than we knew twenty-five or more years ago. Like other sturdy diehards, he makes shrewd thrusts and picks off foolish adversaries while the main body moves past him, possibly in the right direction.

Scurvy as a Skeletal Disease

H. J. VAN WERSCH, M.D. Utrecht: Dekker & van de Vegt N.V. 1955. Pp. 365.

THIS book came about in a curious way. In 1935 the author saw as a patient a girl of 18 with a peculiar bone disease which had been variously diagnosed as sarcoma, von Recklinghausen's disease, and Paget's disease. A shadow in the upper part of the femur, which had led to the first diagnosis, turned out to be a calcified subperiosteal hæmatoma from scurvy. The appropriate treatment was instituted—six years after the onset of the disease—and the patient made a gratifying recovery. During the German invasion of 1940–45, Dr. van Wersch lost touch with his patient, who had again developed scurvy; but after the war further treatment with vitamin C produced improvement. Inspired by his study of this patient, he wrote this book on scurvy in its clinical and laboratory aspects. There is little new work, but the subject is dealt with at length. The book is rather like a large and slightly uncritical M.D. thesis.

Standard Atlas of Human Anatomy (*Descriptive and Regional.* Vols. I and II. 3rd ed. London: Butterworth Amsterdam: Scientific Publishing Co. 1955. Pp. 1154. 72s. 6d. the set).—The third edition of Prof. M. W. Woerdeman's atlas is the first in which the two volumes have been issued together, and in response to the author's wish "to keep in mind the unhappy economical situation of so many students" the publishers have used again the blocks of the first edition. This means that a few unimportant errors in the plates are retained, but the justification lies in the price, which is indeed low for so well-produced an atlas. Vol. I deals with the locomotor system in 512 plates; the other systems are contained in vol. II, which has 642 plates. Each plate depicts an individual specimen, and does not show features derived from several dissections; it is suggested that the student can thus obtain an idea of the range of the normal by comparing his own work with the plates. There are many diagrams showing the lines of pull of the muscles; most of these are helpful, but some might be a little confusing. The central nervous system and the heart are dealt with in detail, and there are some rather complicated diagrams of neural pathways. The peripheral vessels and nerves are shown in a semi-diagrammatic fashion, bereft of all but their largest and grandest relations. Colour is sparingly used, it being contended that the student is forced to look more carefully at a monochrome picture than at a coloured one. The plates are clear, accurate, and well labelled. The terminology used is the B.N.A., and now that the anatomical world has adopted a unified system of terminology based on the B.N.A. this excellent atlas should prove even more useful than before to British students.

made *PURELY* for her . . .

OSTERMILK

Trade Mark

Fat-modified No. 1 — **Full-cream No. 2**

Both contain added iron and vitamin D. In 1-lb containers.

GLAXO LABORATORIES LTD., GREENFORD, MIDDLESEX BYRon 3434

GLAXO

Timothy grass . . . . . insignificant in Alaska

but when pollens are a problem

PIRITON is the most effective therapeutic agent for the control of hay fever symptoms. Owing to its low dosage, lack of side-effects and high degree of tolerance, Piriton may be given with safety over the long periods necessary for adequate control of hay fever. Welcome relief of sneezing and lacrimation is obtained in some cases within 10 minutes and in most cases within 30 minutes; following a single dose, given orally, a relatively symptom-free state may be maintained for up to 6 hours.

Piriton

Trade Mark

TABLETS Piriton Maleate are available in bottles containing 25 and 500 tablets. Each tablet contains 4 mg. of Piriton (chlorpheniramine maleate).

INJECTION of Piriton Maleate is available in boxes of 5 and 100 ampoules of 1 c.c. Each c.c. contains 10 mg. of Piriton (chlorpheniramine maleate).

PAEDIATRIC SYRUP is supplied in bottles of 4 fluid ounces and 2 litres. Each teaspoonful contains 2 mg. of Piriton (chlorpheniramine maleate).

C86/151-2

ALLEN & HANBURYS LTD · LONDON · E·2

TELEPHONE: BISHOPSGATE 3201 (20 LINES). TELEGRAMS: "GREENBURYS, BETH, LONDON"

THE LANCET
LONDON: SATURDAY, MAY 19, 1956

Burns and Scalds

WHEN the kettle is upset, the first decision must be: Do I treat this myself or do I call the doctor? When the doctor arrives, his first decision must be: Do I treat this myself or do I send it to hospital? In reaching these decisions the two most obvious guides are the extent of the injury and the degree of shock; but a third factor which must be considered as soon as possible is the depth to which the damage has penetrated; for failure to recognise that a burn or scald is a deep one is still responsible for long periods of disability. Our correspondent whose letter appears on p. 750 tells how his wife, who is 80 years old, scalded her foot with half a pint of boiling water. The exposure treatment was advised and for weeks the patient was confined to bed, suffering severe pain. Treatment of burns by exposure [1] comes as a surprise to the many people who have been taught that the first thing to do for these injuries is to exclude the air immediately [2]; and naturally our correspondent is doubtful of the value of a method which brought so much distress. Probably in this case the scald went deeper than was at first appreciated. Scalds, even when only a small area is involved, may be very deep; and boiling water may entirely destroy the thin skin of an octogenarian, whereas in the same circumstances it would leave intact the deeper skin cells in the forearm of the baker. After very similar accidents, therefore, the baker's lesion may heal in fourteen days, and the old lady's may take months.

From the days of DUPUYTREN, doctors have recognised the significance of depth as well as the extent of damage, and his "six degrees" have been the accepted classification for over a hundred years.

"... nous avons divisé les brûlures en six degrés ainsi caractérisés: 1° érythème ou phlogose superficielle de la peau, sans formation de phlyctènes; 2° inflammation cutanée avec décollement de l'épiderme et développement de vésicules remplies de sérosité; 3° destruction d'une partie de l'épaisseur du corps papillaire; 4° désorganisation de la totalité du derme jusqu'au tissu cellulaire sous-cutané; 5° réduction en escarres de toutes les parties superficielles et des muscles jusqu'à une distance plus ou moins considérable des os; 6° carbonisation de la totalité de l'épaisseur de la partie brûlée." [3]

With advances in skin-grafting techniques, however, plastic surgeons have concentrated on distinguishing between two, or perhaps three, groups—undoubted skin survival, undoubted full-thickness loss, and cases in which a period of waiting is necessary before it is certain that epithelium will grow over the area again. The first 2 of DUPUYTREN's degrees belong to the first group, the last 3 to the second, and the 3rd degree (which provides most of the cases in hospitals and casualty departments) includes the "uncertain" burns. In the early stages the surface appearance of a burn is only a rough guide to its depth, for it can give no sure indication that the dermis has, or has not, survived.[4] Tests for circulation may be deceptive; for pooling of blood in dead capillaries may produce reversible blanching on pressure, when, nevertheless, coagulation necrosis will result in deep sloughing a week or two later. Loss of sensitivity to pinprick in areas such as the trunk, legs, arms, and backs of the hands (but not the face, scalp, palms, or soles), may indicate full-thickness destruction. This is perhaps the only physical sign of much help in the first few days. Sometimes a firm decision cannot be made until the eschar is beginning to separate, and this may not be until after the second or third week. Electric burns, in which the current has passed through the wound, are particularly difficult to assess and their depth is very often underestimated.

When the family doctor has decided to treat a burn or a scald at home, what can we regard as the "modern treatment," and what advantages can it claim over such simple remedies as ointments or picric acid? The exposure method produces a hard coagulum within two or three days, but, as our correspondent makes plain, the pain may be considerable. Local applications relieve the stinging, and they have the added advantage of making it apparent that something is being done. Moreover, doubt has recently been cast on the superiority of the exposure method by LOWBURY et al.[5] who showed that, although the dry surface of the coagulum remains sterile, the bacterial flora on its under side, where it is hoped that skin regeneration is taking place, may be varied and prolific. The probability is that when skin damage is only superficial, there is little to choose between the healing-times with any form of treatment. If the initial estimate of depth is accurate, therefore, those cases suitable for treatment at home should respond to any method, and there seems to be no objection to the application of a soothing dressing and to the exclusion of air. Before the development of blisters an anti-histamine ointment may minimise the reaction. If blisters have appeared, the "cleavage dressing" [6] of two apposed pieces of tulle gras provides relief, and allows a reassessment in four or five days without disturbing the surface of the burn itself. The outer layer of tulle gras can be peeled off, carrying with it caked gauze, wool, and bandage. This leaves the inner layer attached to the burn, which, while still virtually undisturbed, is painlessly displayed for inspection. All burns should be gently cleaned with a detergent, and dried, before the first dressing is applied. Opinion is divided on the use of antibiotic powders as a local application. In giving their views on the management of burns,[7] the Association of Plastic Surgeons held

1. Wallace, A. B. *Lancet*, 1951, i, 501.
2. First Aid Manual. British Red Cross Society. London, 1952; p. 138.
3. Leçons de M. Dupuytren. Paris, 1832; p. 424.
4. Jackson, D. M. *Brit. J. Surg.* 1953, **41**, 588.
5. Lowbury, E. J. C., Crockett, D. J., Jackson, D. M. *Lancet*, 1954, ii, 1151.
6. Lowden, T. G. The Casualty Department. Edinburgh, 1955; p. 150.
7. *Lancet*, 1954, i, 39. See also The Management of Burns. THE LANCET Ltd., 1954.

that the risk of allergic reactions was too great. Superficial burns cleaned and treated soon after the accident should not need prophylactic antibiotics, but if inflammation spreads around the burn within the first few days it is often the work of the hæmolytic streptococcus, and usually responds rapidly to rest and penicillin. Localised infection by *Staphylococcus aureus*, hæmolytic streptococci, and gram-negative organisms is also a hazard later on in cases in which sloughing and granulations supervene; but this is a problem better dealt with in hospital. The advantages of the exposure method are greatest, probably, in treating superficial burns of the face—a site where dressings cannot easily be held in position, and where bandages require continual attention. After careful cleansing of the burned areas, the corners of the nose, mouth, and eyelids are lubricated with soft paraffin, and the whole burn is allowed to dry as soon as possible. These cases, in particular, should be referred for specialist treatment if at any time there is suspicion that the true skin is seriously involved.

All our devices may fail to yield an accurate initial estimate of the severity, though accuracy increases with experience. Few burns can be seen and assessed immediately by a plastic surgeon. Those of us who see the moderate or severe burn only on rare occasions need not be embarrassed by having to modify our earlier views as the days go by and the slough becomes defined. Where skin-grafting is necessary, the earlier it is done the better. Nevertheless, in the present state of knowledge we must accept that the necessity cannot always be recognised at once. In the doubtful cases an open mind for the first week or two allows a judicious change of policy without a recantation. It will also obviate criticism of any particular method of treatment, where the reason for disappointment lies in the characteristics of the injury itself.

Infantile Pyloric Stenosis

THE adoption of Rammstedt's operation of pyloromyotomy notably improved the results in infantile pyloric stenosis; and, with progress in the hospital care of infants, mortality-rates have sunk to about 2% in many clinics. A discussion held at the Royal Society of Medicine [1] in 1951 revealed various preferences in the matter of preparation for operation, technique, and anæsthesia. Some preferred medical management with atropine derivatives. Nevertheless everyone reported good results, though DAVISON pointed out that the Registrar-General's figures still suggested a mortality for the country as a whole in the region of 10–15%. He considered that treatment in a department where the nurses and doctors were accustomed to dealing with the condition was more important than the particular method used. As family doctors now detect or suspect this not uncommon condition at a commendably early stage, its management seems to present few outstanding difficulties.

Rammstedt's operation has now been in use long enough for some of the earlier patients to be having children. This has stimulated interest in other facets of the natural history of the disease. An increased liability to pyloric stenosis in the children of previously affected parents has been recognised for some time. COCKAYNE and PENROSE [2] suggested inheritance by a recessive gene influenced by sex and birth order. Further studies have shown that the ætiology may not be so simple. MCKEOWN and MACMAHON [3] have examined the offspring of men and women who have recovered from infantile pyloric stenosis. Adding the figures from CARTER and POWELL [4] and NEILSON'S [5] studies to their own Birmingham series, they found 14 "pylorics" amongst 203 children of affected parents—a high incidence of 6·9%. Further search among records of their own and other centres revealed 33 instances of parent and child having this disease. The affected parent was the mother in half of these, in spite of the well-known higher incidence in males. Furthermore, examination of their fraternities showed that an even greater proportion of the children in these particular families suffered from the condition (42 out of 69 children). The conclusion drawn was that the increased risk of having affected children was not the same in all survivors, but was localised in certain families and was increased when the mother was the affected parent. MACMAHON and MCKEOWN [6] have also studied the concordance in twins. It used to be thought that identical twins would both be affected if either had the disease. SHELDON [7] observed an exception, and others were described later by CARTER and POWELL.[8] An environmental factor in the development of pyloric stenosis might account for this. MACMAHON and MCKEOWN found in their series, which they believed to be more representative than earlier ones, that there was no increased concordance in monozygous twins compared with dizygous. They support the suggestion of a postnatal environmental influence. That the tumour itself usually develops after birth has been accepted for some time.[9] GERRARD and his colleagues,[10] also working in Birmingham, have measured the size of the tumour in 51 cases and have confirmed an earlier finding of MCKEOWN et al.[11] that its size is proportional to the age of the baby at operation. The onset of symptoms was more rapid in the babies fed three-hourly than in those on a four-hourly schedule. The relative importance of inherited characteristics and postnatal influences can be assessed only by further inquiries along these promising lines.

The number of particularly susceptible newborn children seems likely to increase as more survivors of infantile pyloric stenosis begin their families. Prophylaxis of the condition by medical means may seem a a wise course when the risk for each individual baby can be better assessed. In this connection a paper by CRAIG [12] is timely. He felt a contractile pyloric tumour in 17 out of 21 babies who were examined during the first two weeks of life for failure to thrive associated with possetting, regurgitation, or vomiting. Only 3 were operated on; and 2 had a typical hypertrophied pylorus. All the others recovered promptly with gastric lavage. Moreover, using precise

1. *Proc. R. Soc. Med.* 1951, **44**, 1055.

2. Cockayne, E. A., Penrose, L. S. *Ohio J. Sci.* 1943, **43**, 1.
3. McKeown, T., MacMahon, B. *Arch. Dis. Childh.* 1955, **30**, 497.
4. Carter, C. O., Powell, B. W. *Lancet*, 1954, i, 746.
5. Neilson, O. S. *Acta paediat., Stockh.* 1954, **43**, 522.
6. MacMahon, B., McKeown, T. *Acta genet. med. gemel.* 1955, **4**, 320.
7. Sheldon, W *Lancet*, 1938, i, 1048.
8. Carter, C. O., Powell, B. W. *Arch. Dis. Childh.* 1951, **26**, 45.
9. Wallgren, A. *Amer. J. Dis. Child.* 1946, **72**, 371.
10. Gerrard, J. W., Waterhouse, J. A. H., Maurice, D. G. *Arch. Dis. Childh.* 1955, **30**, 493.
11. McKeown, T., MacMahon, B., Record, R. G. *Lancet*, 1951, ii, 556.
12. Craig, W. S. *Arch. Dis. Childh.* 1955, **30**, 484.

criteria for physical signs, a tumour was also found in a considerable proportion of well babies of this age (25 of 115 babies under two weeks old). A barium meal was given to 62 of the babies, and hurry seemed more common than delay in emptying of the stomach. Post-mortem examination of the pylorus in 138 newborn or stillborn babies did not reveal any muscular hypertrophy corresponding to this frequent clinical finding of a palpable tumour. CRAIG's important conclusion was that a palpable tumour in the first two weeks of life is not evidence of an organic change in the pylorus; it seems rather to indicate a dysfunction which can resolve rapidly. It is comforting, however, to note that these tumours, although similar to those of hypertrophic pyloric stenosis in rather older babies, were not usually identical. They were not so firm, well defined, or rapidly contractile; and they did not fit so aptly the classical description of the tumour of pyloric stenosis as resembling an olive suddenly appearing beneath the examining finger. It seems that attention to detail must be even stricter in assessing a palpable tumour in the newborn than in the slightly older baby suspected of having hypertrophic pyloric stenosis.

CRAIG discusses the condition of pylorospasm as an entity causing vomiting in the absence of organic pyloric hypertrophy. On the other hand, THOMPSON and GAISFORD [13] believed it "exists more in the mind of the pædiatrician than in the abdomen of the child." WOOD and ASTLEY,[14] however, when they were studying a group of babies with vomiting of uncertain origin, considered that they had radiological confirmation of pylorospasm in some of their rather older "non-persistent" vomiting babies. Clinically their cases bore some resemblance to those described by CRAIG. In a contrasting group, there were persistent vomiters some of whom later showed evidence of gastro-œsophageal abnormalities. These conditions, such as œsophageal hiatus hernia, must also be borne in mind in the diagnosis of vomiting in these younger babies. Perhaps the term pylorospasm should be retained as a convenient label suggesting a reversible upset of function rather than as an exact diagnosis. CRAIG agrees with THOMSON's view [15] that such babies often empty their stomachs by repeated small vomits rather than by one copious vomit, as in typical hypertrophic pyloric stenosis. The affected babies in CRAIG's series stopped vomiting with no more treatment than gastric lavage; but he mentions the possibility of giving antispasmodics. Some people may feel that this might confuse the issue and lead to difficulty and delay in diagnosis when there is in fact an organic cause.

CRAIG's investigation is modestly described as a pilot study showing that a palpable tumour is not evidence of organic hypertrophy of the pylorus in babies under two weeks of age. Further research along these lines should increase our knowledge of gastric function in the newborn. Moreover, this knowledge may become of increasing practical importance in the examination of babies who are shown, by such ætiological studies as those undertaken in Birmingham, to have a greatly increased risk of developing true hypertrophic pyloric stenosis.

13. Thompson, W. A., Gaisford, W. F. *Brit. med. J.* 1935, ii, 1037.
14. Wood, B. S. B., Astley, R. *Arch. Dis. Childh.* 1952, **27**, 562.
15. Thomson, J. The Clinical Study and Treatment of Sick Children. Edinburgh, 1921; p. 291.

The Medresco Hearing-aid

THE 'Medresco' hearing-aid was introduced with the National Health Service in 1948, and it remains one of the very few appliances that can still be obtained entirely free of charge, on the recommendation of a consultant otologist. That it is one of the most widely appreciated amenities of the health service has long been apparent to those working in hearing-aid clinics. What is perhaps not quite so fully recognised is the type of case likely to benefit from the use of a hearing-aid. Deafness can be classified into three broad categories: conductive deafness, from deficiencies in the sound-conducting apparatus; perceptive or nerve deafness, from affections of the neural apparatus of hearing; and mixed deafness, by which is commonly understood a combination of conductive and perceptive deafness. Many causes of conductive deafness, such as otosclerosis and inflammations of the middle-ear cleft, can be treated by medical or surgical means, with varying degrees of success. When these measures are unsuccessful or the patient declines them, nearly all patients with conductive deafness can derive very real benefit from the use of a hearing-aid. The problem of perceptive deafness is much more difficult and the results less happy; for perceptive deafness is essentially untreatable and the hearing obtained through an electrical aid is less satisfactory. But fortunately most deaf people fall into the conductive group; and even in nerve deafness modern developments in construction and design have produced hearing-aids that can bring relief to many who were previously thought to be beyond their help.

"The requirements of an ideal aid are: high amplification, high fidelity, small size and weight, low power consumption and low cost. Not all of these qualities can be achieved in practice. Objectives of low cost and light weight are directly opposed to the objectives of high fidelity, high amplification and long battery life." [1] This is certainly true of valve aids, and all models of the medresco are at present valve aids. It is also partially true of the newer transistor aids now being manufactured, but these do, in fact, combine lightness of weight with high fidelity, high amplification, and long battery life. But a transistor aid costs considerably more than a valve aid. With increasing experience in the development of the transistor aid, costs should fall.

Last year GEFFEN and TRACY [2] recorded an investigation into the distribution and use of medresco aids supplied by the Royal National Throat, Nose, and Ear Hospital in London to residents of St. Pancras. 419 aids were issued between June, 1948, and May, 1953, the period covered by the survey. 330 of these patients were visited and interviewed by one of the borough's sanitary inspectors. The object of the questionary was to determine how much the aid was used and how valuable it was. 31% used their aid all the time, 57% used it only part of the time, and 12% had ceased to use it altogether. In other words, 88% derived some benefit from the aid. In almost half the cases, the aid had never caused any trouble, and in a further third very little trouble; in the remainder the instrument had failed frequently.

1. Fisch, L. *Med. ill.* 1954, **8**, 362.
2. Geffen, D., Tracy, S. M. *Med. Offr*, 1955, **93**, 261.

Among the 40 people who had stopped using their aids, the commonest reason given was noise and headache; 9 of them complained that the aid was too heavy. Thus, the great majority of those who received the medresco aid were much better for it. GEFFEN and TRACY remarked: "Our general impression is that individuals who obtain employment and become deaf in the course of years usually retain their occupation and are helped to do so as the result of the provision of a hearing-aid. On the other hand, deafness as such appears to make it difficult for some individuals to obtain employment, which difficulty is often overcome by the provision of a hearing-aid." They made no attempt to correlate the value of a hearing-aid with the causes of deafness. From a medical rather than from a social point of view this information is, of course, of the utmost importance.

KODICEK and GARRAD [3] have lately described a large survey of users of the medresco aid, and they included in their findings considerable detail about the relative values of the aid in different types and degrees of deafness. They sent out 1459 questionaries to all patients who had been issued with an electrical hearing-aid by the ear, nose, and throat department at St. Thomas's Hospital at least six months previously. 964 replies were analysed. The patients were placed in one of four main diagnostic groups according to the primary causes of deafness: otitis media (29% were in this group), otosclerosis (41%), presbyacusis (senile deafness) (15%), and nerve deafness from other causes (15%). Thus, 70% suffered from conductive deafness; and the remaining 30% were about equally divided between cases of acquired nerve deafness and senile cochlear changes. The otosclerotic group made the best use of the aid and seemed to get most help from it, wearing it both for work and pleasure. The otitis-media group was second best, as expected on clinical grounds. These two groups accounted for more than two-thirds of all the patients, yet only half of the 93 returned instruments came from patients in these groups. An average loss of 60 decibels in the speech frequencies for both ears (by pure-tone audiometry) was taken as the dividing line between moderate and severe deafness, and it is interesting that those who were judged to be only moderately deaf were more critical of the aid, and used it less often, and for fewer hours each day, than did patients with severe deafness. Over half the employed people used their hearing-aids at work; but, from volunteered comments, it was clear that factors limiting the use of the aid at work were weight of batteries, background noise from clothes rub, and restriction of movement by the leads. On the other hand, 19 patients volunteered the information that the aids had enabled them to stay at or return to work. In reply to direct questions, over 90% said they found their aids helpful and that they had made their lives easier or more enjoyable. The fact that 525 people failed to reply raises the question of the general applicability of the findings; and KODICEK and GARRAD think it probable that there was a larger proportion of satisfied patients among those who replied than among those who did not.

However that may be, there are many thousands of people whose lives have been changed by the medresco hearing-aid. When the National Health Service was introduced, the Government set out to produce an aid that would benefit the majority of deaf persons, at a reasonable cost: they succeeded. That is not to say there is no room for improvement: there are very few hearing-aid users who would not welcome a less cumbersome "monopack" aid, and a preliminary trial has already been carried out with such a model. It is only to be hoped that its general issue will not be too long delayed, although we are already warned that the earliest issues will be reserved, quite rightly, for children. The transistor aids, with their lighter weight and longer battery life, offer attractive possibilities for the future, but they have yet to be put to the hard test of daily wear and tear, and it would be unreasonable to expect this latest modification to be applied to the Government aid until its rightful place has been carefully assessed. As HELLER [4] puts it, "the advantages of transistor hearing-aids lie in the realm of convenience and economy rather than in performance. . . . It is well to bear in mind that vacuum tubes have been used and studied for a much longer time than have transistors. The latter are but recently developed and have considerable margin for change and improvement."

3. Kodicek, J., Garrad, J. *J. Laryng.* 1955, **69**, 807.

4. Heller, M. F. Functional Otology. New York, 1955.

Annotations

PRINTING DISPUTE

SINCE work was provisionally resumed in the London printing-houses seven weeks ago, we have produced abnormally large issues of our journal so as to make up for some of its deficiencies in February and March. But some obligations to subscribers and contributors inevitably remain unfulfilled; and, now that a settlement of the printing dispute has been announced, the Proprietors have decided to extend subscriptions to THE LANCET for four weeks beyond the present date of expiry. To readers who obtain the journal through a bookseller or newsagent, and who were supplied with our token copies in February and March, no charge will be made for the four issues of July.

ANÆSTHESIA IN OBSTETRICS

THE benefits of new drugs and techniques in general anæsthesia are only slowly being brought into obstetric practice. There can be few set operating-lists in obstetrics, and anæsthesia may be needed at any hour of the day or night. Consequently the duty of giving the anæsthetic often falls to a junior and inexperienced resident. But obstetric anæsthesia is seldom a simple matter; the patient may be unprepared and seriously ill, and there is usually a second life to consider. Anæsthesia now holds an unenviably high place among the causes of maternal mortality,[5] and it therefore seems likely that a proportion of maternal morbidity and fœtal complications can also be attributed to it. Yet modern methods, properly applied, have much to offer, not only by making conditions safer for operative obstetrics but by conferring advantages which, though less easily measured, can be found in such factors as a higher-than-normal maternal oxygen concentration and relaxation of skeletal muscle without uterine or fœtal depression.

On another page Dr. Coleman and Dr. Day describe the use of a cuffed endotracheal tube in obstetric anæs-

5. See *Lancet*, 1955, i, 956.

thesia, primarily to prevent the aspiration of gastric contents. The essence of their technique is to induce anæsthesia with a mixture of cyclopropane, nitrous oxide, and a high concentration of oxygen, and then to use the short-acting muscle relaxant, succinylcholine chloride, to produce favourable conditions for intubation. When the tube is in the trachea and the cuff inflated, they maintain anæsthesia on a light plane with a similar mixture of gases, and once the succinylcholine has worn off relaxation is produced by intravenous gallamine triethiodide. Respiration is assisted or controlled as necessary. Many people will protest that this seems to be an unnecessarily complicated technique for obstetric practice, and that it introduces the potential hazards of muscle paralysis, while not entirely excluding those of aspiration until the cuffed tube is in position. Yet in its essentials this is a method with which many anæsthetists are familiar in the operating-theatres of general hospitals, and which, in its ultimate results, has been shown to be of considerable value. Moreover, the use of an endotracheal tube not only eliminates the risks of aspiration but also ensures adequate oxygenation at all times and satisfactory conditions for operation with the minimum of depressant anæsthesia. Paradoxically, should it be desirable or necessary to deepen anæsthesia, this can be done easily and quickly. All in all, the obstetrician is not called upon to hurry because of the anæsthesia.

With such a method dangers are most likely at induction and during the period before intubation is complete. During induction there is a risk of vomiting, but with the onset of paralysis this is superseded by that of passive reflux. In considering the prevention of these complications, not all anæsthetists would agree with Coleman and Day's method of induction with cyclopropane and nitrous oxide, which is relatively slow, followed by inflation of the lungs before intubation and with the patient horizontal. Quicker loss of consciousness can be achieved by a 50% mixture of cyclopropane and oxygen inhaled from a 6-litre bag [6]; and a head-up tilt will help to prevent reflux from the œsophagus when the patient is paralysed. With this technique the mother's oxygen saturation remains high enough for intubation to be performed without prior inflation of the lungs; but the tube must be passed without delay.

The success and safety of these and similar types of anæsthesia depend upon two essentials—an experienced anæsthetist and adequate equipment. Indeed the standard of labour-ward anæsthesia—whatever the technique—will be raised only when both are freely available. Coleman and Day are at pains to emphasise this, and they point to the need for an efficient suction apparatus and a labour-ward bed that can be quickly tilted.

If these methods of anæsthesia become generally acceptable in hospital practice, what should be done in domiciliary work? There is little to recommend them for use in the home even in the hands of an anæsthetist of experience. There is a problem here, especially for the teaching hospitals. What are students to be taught about obstetric anæsthesia and how are they to be equipped to deal with an emergency in domiciliary practice?

BRAND-NEW SHAMBLES

ALLOCATIONS to hospitals for capital expenditure still lag behind real needs; and we should all like to believe that any money which the country spares for this purpose is prudently used. A few months ago a new operating-theatre suite was opened at a hospital in the Home Counties. The following were among the defects which came to light.

In the *theatre* eleven floor-blocks were loose; when stepped on, they went down at one end and up at the other. Four of the encased radiators leaked, and every day rags had to be placed here and there on the floor to absorb the water.

In the *sterilising-room* the steriliser itself leaked, and some of its taps leaked and could not be used. It had been so installed that it could not be serviced without complete disconnection. The hood above it, to collect the steam, came no farther forward than the front of the steriliser. Accordingly steam condensed on the ceiling, from which water fell impartially on the sterile and the non-sterile. Subsequently the paint on the ceilings of the sterilising-room and the sluice-room peeled off.

The *swing-doors* warped and dropped, catching against each other.

Most of the faults might perhaps have been averted by closer supervision of the building work, and one or two by consulting accounts of the design of other operating-theatre suites—this, after all, is not the first to have been erected in Britain. A harassed staff has for the past month been working in the theatre which they had hopefully discarded, while the new theatre is being put in order. We hope that their unhappy experience may, by example, help to avert such happenings elsewhere.

LUNG CANCER IN YOUNG PERSONS

IN England and Wales during 1954, 308 persons under 40 years of age were certified dead from lung cancer.[1] This was only a small proportion—less than 2%—of the total lung-cancer certifications; but the disease in young patients has some interesting features. For instance, the ratio of men to women—3 to 1—is lower than in older people, and the squamous type of cancer is much less common. Neuman et al.,[2] at the Mayo Clinic, have studied 51 patients under 40 and found only 4 (8%) with squamous tumours, compared with 34% among patients of all ages at the same hospital.[3] On the other hand, there were 37% with adenocarcinomas (the type believed to be less commonly related to cigarette-smoking [4–6]), whereas there were only 13% in the whole group. In the young the disease runs a more rapid course. In one series only 31% of patients under 50 who were not treated surgically or by radiotherapy survived for a year, compared with 46% of those over 70.[7] Neuman et al. state that the survival-rate after resection is "definitely lower" in young patients. But their conclusions are based on only 13 resections; and Bignall and Moon [8] found that in 77 patients under 45 who survived operation the five-year-survival rate—45%—was in fact higher than that of patients aged 45–59; and the distribution of histological types among their young patients was much the same as that in older patients. There seems to be insufficient evidence at present to conclude that in young people the outlook after resection is necessarily bad.

Anderson et al.[9] found that chest or shoulder pain was the commonest presenting symptom in 30 young men; this symptom was recorded in almost three-quarters of them. In most large series of patients of all ages cough is the commonest early complaint. There is some indication that among those whose illness begins

6. Bourne, J. G. *Brit. med. J.* 1956, i, 984.

1. Registrar-General's Statistical Review of England and Wales. Part 1. Medical. 1954. H.M. Stationery Office.
2. Neuman, H. W., Ellis, F. H., McDonald, J. R. *New Engl. J. Med.* 1956, **254**, 502.
3. Kirklin, J. W., McDonald, J. R., Clagett, O. T., Moersch, H. J., Gage, R. P. *Surg. Gynec. Obstet.* 1955, **100**, 429.
4. Doll, R., Hill, A. B. *Brit. med. J.* 1952, ii, 1271.
5. Breslow, L., Hoaglin, L., Rasmussen, G., Abrams, H. K. *Amer. J. publ. Hlth*, 1954, **44**, 171.
6. Wynder, E. L. *Penn. med. J.* 1954, **57**, 1073.
7. Bignall, J. R. *Lancet*, 1955, ii, 210.
8. Bignall, J. R., Moon, A. J. *Thorax*, 1955, **10**, 183.
9. Anderson, A. E., Buechner, H. A., Yager, I., Ziskind, M. M. *Amer. J. Med.* 1954, **16**, 404.

with chest pain there may be more in an advanced stage of the disease than there are among those who first have other symptoms.[7] Taylor and Waterhouse [10] found that only 3% of 332 in whom the illness began with pain had a pneumonectomy, compared with 9% of those in whom the illness began with a cough and 13% of those in whom it began with hæmoptysis. Neuman et al., however, noted little difference in the proportion who underwent resection between patients under 40 and patients of all ages.

There is probably a greater danger in young people that the correct diagnosis will be missed, for in them lung cancer may not be so readily suspected. As we seem to be in the early stages of what has been termed a "pandemic" of lung cancer [11] this disease might well be put higher on the list for differential diagnosis even in those under 40.

SEMI-RETIREMENT

LAST week the National Insurance Advisory Committee recommended that the earnings rules for retirement pensions should be relaxed.[12] By their terms of reference they could suggest no radical changes, but their report has strengthened public interest in the principles on which our pension scheme is based. The committee recommended, and Parliament has now agreed, that retirement pensioners shall in future be allowed to earn 50*s*. instead of 40*s*. a week without loss of pension, and that pensioners earning over 50*s*. a week shall have sixpence deducted from their pension for each shilling earned between 50*s*. and 70*s*. a week. This means that a pensioner can earn up to £5 a week before his pension is extinguished.

Probably these changes are as far as we can go without jettisoning the principle of pension on retirement rather than at a fixed age. Whether the principle is worth retaining is another matter. When unemployment was a national bugbear it was sensible to encourage elderly people to retire early and to give them some modest help to do so. But overemployment not underemployment is now our trouble, and today it might be equally sensible to encourage old people to remain at work as long as possible. Furthermore the proportion of old people in our population will rise steadily in the coming years. The help that they could give us will accordingly become more substantial, and, if need be, make it worth altering or adapting industrial traditions. In his reservation to the Phillips Committee's report Prof. A. K. Cairncross recast the problem. "Men of 65–70 (he said) should be free to choose not whether to retire but how much to retire." It is doubtful whether our present system of pensions gives them this freedom.

In defence of the principle of retirement and its bulwark the limitations of earnings, it is usually argued that employers would use the pensioner to cut wages, and that we cannot afford to pay full pensions irrespective of earnings. The advisory committee note that the abolition of the earnings rule would cost £76 million straight away. In his recent review of the subject Mr. Alan Peacock [13] was not greatly moved by either of these objections. The trade unions, he felt, might be relied on to defend the wage front. The Government Actuary on the other hand, he thought, might be overanxious. Had he not left out of account what the pensioners would bring to the Treasury by their effect on production and by their own increased expenditure? But Mr. Peacock agreed that the subject was difficult, for we are discussing the pensions problems "without any supporting inquiry into the economic resources of the aged."

10. Taylor, A. B., Waterhouse, J. A. H. *Thorax*, 1950, **5**, 257.
11. Clemmesen, J. *Dan. med. Bull.* 1954, **1**, 37.
12. Cmd 9752. H.M. Stationery Office, 1956. 2*s*.
13. *Manchester Guardian*, May 4, 1956, p. 8.

Our nescience does not cover only the economic problems of the aged but extends to the intricacies of their pattern of employment. Here Mr. F. Le Gros Clark, with the backing of the Nuffield Foundation, is offering us a series of detailed reports on the kind of jobs that the elderly find for themselves. In his latest report [14] he has continued his inquiries among the employment exchanges, and has discovered that many of the jobs found for the elderly are those that "have survived with us from the largely unmechanised world of the past." Perhaps this is a complementary problem to automation and one which in its way may prove as important.

POLIOMYELITIS FLOCCULATION REACTION

SPECIFIC flocculation reactions take place when a bacterial or viral antigen and its specific antibody are brought together under suitable conditions; macroscopically visible aggregates or clumps, appearing in antigen-antibody mixtures but not in controls, indicate a positive result. The term "flocculation" covers two phenomena: agglutination reactions, in which suspensions of large particles, such as bacteria, are clumped by specific antibody; and precipitin reactions in which very small particle antigens (often referred to loosely as soluble antigens) are precipitated by their specific antibody. Basically the reaction is the same in both cases. The term flocculation is sometimes used to cover them both, and also to describe the clumping of particles intermediate in size between bacteria and small-particle antigens—for example, viruses. Antigens which flocculate with their specific sera usually fix complement under appropriate conditions, and flocculation and complement-fixation have been useful techniques in investigating the antigenic properties of viruses and the serological responses of men and animals to infection. Flocculation reactions generally require the use of more concentrated and purified antigens than do complement-fixation tests, and for that reason the latter have been more often applied in virological investigations.

Recently Belyavin [15] showed that a specific flocculation reaction between influenza virus and antibody could be used for serological investigation of these viruses. Prof. Wilson Smith and his colleagues have followed this by applying the flocculation reaction to the poliomyelitis viruses, and on p. 710 they show very clearly that specific flocculation occurred when purified type-1 and type-3 poliomyelitis-virus antigens were mixed with specific rabbit antisera. There is also preliminary evidence to suggest that specific flocculation may take place with sera of children convalescent from poliomyelitis. The test is likely to be useful in investigating the antigenic structure of the poliomyelitis viruses. On the other hand, it is less likely that without substantial modifications the test will be much used in the routine laboratory diagnosis of poliomyelitis. This is because relatively large amounts of an antigen which has been previously concentrated 38·5 or 77 times are required, and it may be that complement-fixation would be a more economical test to apply to this material. If not, however, the possibilities of a micro-test seem well worth exploring. It would also be important to devise some method of inactivating the virus, if the test is to be used as a routine laboratory procedure.

THE next session of the General Medical Council will open on Tuesday, May 29, at 2.15 P.M., when Sir DAVID CAMPBELL, the president, will deliver an address. The Medical Disciplinary Committee will meet on Wednesday, May 30, at 2 P.M.

14. Le Gros Clark, F. Employment Problems of Elderly Men. 1956. Pp. 25. A limited number of free copies available from the Nuffield Foundation, Nuffield Lodge, Regent's Park, London, N.W.1.
15. Belyavin, G. *Lancet*, 1955, i, 698.

The Wider World

TUBERCULOSIS IN THAILAND

The Story of a Venture

A. J. BENATT
M.D.
FORMERLY W.H.O. SENIOR MEDICAL OFFICER, TUBERCULOSIS CONTROL PROJECT, THAILAND

IN many Eastern countries, though immunisation of large numbers of children with B.C.G. may be feasible, there are grave difficulties in introducing other Western methods of controlling tuberculosis. Is it, in fact, worth trying to introduce them until social and economic circumstances change? In particular is it worth establishing a "tuberculosis control project" like the one in which I worked in Thailand? Since the answer to these questions is important for people in the East, I shall describe what we tried to do and what we did.

Unlike its neighbours Burma, Indo-China, and Malaya, the kingdom of Thailand has never been under foreign rule. Its population of nearly 20 million are Siamese and Chinese—the latter mostly immigrants. Poverty is widespread. Bad housing, overcrowding, and malnutrition—particularly in the capital, Bangkok, a city of over a million—provide all the conditions favouring a rapid spread of infections, including tuberculosis. Tuberculin testing of school-children showed in 1951–52 a positive Mantoux reaction in 70% at the age of 15, suggesting that children are much exposed to the disease. A random-sampling radiographic survey in 1954 revealed a tuberculosis prevalence of at least 5% in the capital, and the figure was probably higher in the poorer quarters. Tuberculous meningitis and miliary lesions were common.

The General Plan

Confronted with tuberculosis in a country where modern measures of control have hardly been attempted, a W.H.O. team-leader will think it his principal task to prevent the spread of the disease, especially to the young. The first essentials, when a case is recognised, are to make the sputum free from tubercle bacilli, by the simplest means, and to safeguard possible contacts. Compared with the control of infection the further treatment of patients is a secondary objective.

But, however correct this may be in theory, it did not prove workable in practice. In Thailand we found a small tuberculosis hospital, of 75 beds, in which patients had been kept for years with little hope of recovery or discharge—a picture of gloom. This hospital, having lately come under the jurisdiction of the tuberculosis division of the government, was the main concern of the chief of that division, and he asked our help in alleviating some of its worst features. Our activities in the hospital were evidently to be the acid test of the usefulness of the international team—a *hic Rhodus, hic salta*. So, without neglecting preventive duties, we had to give a certain priority to amending as well as preventing therapeutic disasters; and it was not long before we found that, in point of fact, understanding of the importance of the social aspects of tuberculosis or other diseases could be imparted to the national staff more effectively if relief to the physically distressed could be demonstrated. In the two medical schools of Thailand, preventive and social medicine were not part of the curriculum. With its discussions on ward rounds and clinical conferences the tuberculosis hospital offered a golden opportunity to inculcate and encourage thinking in terms of prevention, social needs, and rehabilitation.

The Team and Its Language

Since 1949 a tuberculosis service of the Thai health department had gradually developed, with a physician in charge who had had several years' training in the United States. A chest clinic had been established with a small laboratory, radiological apparatus, and a small nursing service. Under an agreement with W.H.O., an international team was to be sent to Bangkok to set up a demonstration centre and to teach and train local staff. The government had promised to provide for each international member a suitable counterpart, preferably with previous experience in his field, the counterpart to the team-leader being the director of the tuberculosis division. Parts of the project were to be equipped by UNICEF.

The international personnel, who were sent to Thailand one by one during the latter part of 1951, consisted of a British-trained laboratory technician, a British public-health nurse, a Dutch radiographer, a Chilean epidemiologist, an Indian statistician, and a British team-leader—this last replacing, in June, 1952, a Swiss physician who had initiated the project. Two British laboratory experts came for short periods to give advice, and a Danish laboratory technician to revise the sputum-culture technique. A Swedish technician assisted for a few months in improving the radiological technique.

The language was to be English. As only a few of the Thai team, of whom some had held fellowships abroad, knew much English, the language barrier was (and remained) a difficulty, especially with the technicians, who had seldom learnt English at school. However, the Thais got to know English far more rapidly than the international team got to know Thai. To have to acquire a difficult language imposes a serious additional strain on people tired by a day's work in great heat and humidity, and I would urge the need for teams, *before* they go abroad, to get acquainted with the fundamentals of the language of the country to which they are assigned. The language barrier is also important in relation to clerical assistance. In Thailand, anyone proficient in English could earn from commercial firms high salaries with which the government could not compete. Thus the international staff had to spend on clerical work much time that should have been spent in other ways.

The Central Chest Clinic

The chest clinic lay in the heart of a congested middle-class shopping area in the centre of Bangkok. In 1952, a few months after the project began, there was a monthly attendance of 2800 of whom more than 500 were new patients. Two years later, when the project ended, the corresponding figures were 3500 and 750. Of those attending for the first time half were found to have tuberculosis.

More than three-quarters of those who came to the clinic sought advice of their own accord; others were referred by the mass X-ray survey of the project, while a few were sent by their doctors or by other organisations. About 40% lived far outside the Bangkok area; and, in hope of getting effective treatment, many had to make long journeys by boat and train, not infrequently taking two or three days, or even longer, to reach Bangkok.

A new patient entered the chest clinic by a special entrance which was also used by sputum-negative patients. Entrances and waiting-rooms were put at the two opposite ends of the building so as to minimise the mixing of the tuberculous and non-tuberculous. When the team left, an entirely separate small block only for contacts was under construction.

Facilities for Diagnosis

Every patient seeking advice had a 70-mm. film taken by a static mass-radiography unit. At the same time the tuberculin test with 5 units P.P.D. was applied. If he was very ill, a clinical examination followed immediately; but otherwise he was asked to return in three days for the results of the miniature X ray and for the reading of his tuberculin test. Patients without radiographic abnormalities were then discharged, unless special

symptoms necessitated their recall. Where abnormalities had been found, a large film was taken and the patient was given a clinical examination and sputum tests (or, in the absence of sputum, a laryngeal swab). When other lesions were suspected—e.g., bronchiectasis or amœbic abscesses (which were frequent)—physical examination and special laboratory tests followed, and the patient usually went to the tuberculosis hospital for bronchoscopy or bronchography. But, with all these diagnostic facilities, some cases remained undiagnosed. They were those with cavitation resembling tuberculosis but with negative cultures and equivocal histoplasmin and other skin tests. Though sputa were repeatedly examined for parasites and fungi, our facilities for and knowledge of, special methods were quite often insufficient for any firm diagnosis.

Sputum tests were based on the standard staining technique, followed by cultures to exclude acid-fast saprophytes. Owing to the shortage of incubator space only those positive sputa could be cultured which did not tally with the radiological appearances. Before the termination of the project, amendments to such technical shortcomings had already been approved.

As a routine, cultures were set up in two bottles, one containing Löwenstein-Jensen and the other Medlar-Sesano medium, which were prepared in the project's own laboratory. The processing of cultures was hindered by shortages of reagents unobtainable in Thailand, by electricity cuts which affected the running of the incubators, and above all by contamination with moulds, which during the rainy season abounded everywhere—in books, in shoes, in clothes, and (not surprisingly) in the laboratories too. Repeated revision, and strict observation, of sterility rules, on which expert advice was sent from the Serum Institute in Copenhagen, reduced the contamination-rate to 3% at the time of the team's departure and after another year's experience it had come down to 1%.

The laboratory also undertook tests of sensitivity to streptomycin and drugs, blood-grouping, and clinical blood examinations (for which a small room with separate entrance was set aside). It did routine examinations of excreta, especially for intestinal parasites and their ova.

Prevention

In the domain of prevention the public-health nurses held the key position. As soon as the diagnosis of tuberculosis was made, or suspected, the doctor referred the patient to them.

The general plan was directed towards :

(1) Prevention of primary infection.
(2) Prevention of breakdown of lesions seemingly healed.

PREVENTION OF PRIMARY INFECTION

Elimination of Source of Infection

As it was impossible to admit every patient to hospital the first subject of instruction was the collection and *disposal of sputum* and contaminated material. The standard practice was to use as sputum containers the cigarette-tins so abundant in Thailand. They had to be placed on a charcoal fire until the contents turned black ; and the nurses spent much time in explaining their correct use, recommending a no-touch technique in which the tins were handled with tongs. When it was discovered that little children—numerous in nearly every dwelling—played with the tins and upset their contents, patients were told to put them out of reach ; but, since in hot countries people squat on floor-mats, such counsel proved more theoretical than practical. A new plan was therefore adopted whereby rolls of toilet-paper were used as handkerchiefs and were immediately slipped into paper bags, made from newspaper, which could easily be fixed on a chair or at the bedside and could be burned daily. This became also the routine method at the tuberculosis hospital, where a paper bag was attached to each bed—which was quite handy for the very sick and instructive to students. The nurses then advised on how to cleanse contaminated linen—by soaking it in soapy water before washing—and on how to make full use of the sunlight for the sterilisation of blankets, pillows, and the like. In tests made by W.H.O. bacteriologists in India the sun killed tubercle bacilli, in a layer 2 mm. deep, in two hours, and its sterilising action has earned it the title of " the most effective minister of health in the East."

The next important step was to impress on the patient the need for *segregation*, particularly at night. This was the most difficult preventive measure to put into practice. In Bangkok two types of dwelling were in use by the needy :

(1) Huts made of bamboo and atap-palm, or of wooden planks built on stilts. Though sometimes there was space under the house, this was often flooded (the rainy season lasts five to six months) and full of refuse.

(2) Small one-storey houses in rows in narrow lanes with no space outside in which sleeping-benches could be put up.

The average size of a room accommodating about 6 persons was 4–5 square metres. Ventilation was fairly good on the whole, and the rooms were generally kept clean ; but sanitation was extremely poor, with primitive means of disposing of fæces and waste. Lighting was by kerosene lamps which were a fire hazard. Furniture was at a minimum, the chief item being a mosquito net under which five or six people slept on grass mats on the floor.

Desperate though this situation was in most of the dwellings, there were some more spacious habitations which even had a yard or some little extra ground where a separate bench could be erected. This had to be

Fig. 1—Segregation.

Where some grounds or a yard were available, tuberculous patients were advised to use simple inexpensive sleeping-benches made of wood from crates or remnants of wooden boxes. A mat was laid on the floor of the bench and a mosquito-net affixed. The health visitor is seen on the left.

constructed in the simplest possible way with the least possible expense to the patients most of whom were living below subsistence level. The wood of crates or boxes was used for the basic structure to which a mosquito net was affixed (fig. 1).

Because segregation was so difficult, other ways of preventing the spread of infection had to be found. The *combating of cough and sputum* became one of the project's main objectives. One of the recognised means of diminishing cough is rest; but this rule was hard to observe in the hot and humid climate of Bangkok: moreover, most of the people had to go out daily to earn their living, whatever their physical condition—the more so since there was no system of financial assistance for the sick. Streptomycin, with the two cover drugs, is usually effective against cough and sputum; but in order to get it the patient had to go to the chest clinic at a sacrifice of time, working hours, fares, or rest. We were considering, therefore, whether we could recruit and organise a flying squad of nurses who would go out in jeeps to the various districts to give streptomycin injections. But when the first results of a Medical Research Council trial on isoniazid and *p*-aminosalicylate treatment by mouth were published [1] this plan was abandoned. The M.R.C. workers had found combined use of these two drugs almost as efficacious as the use of streptomycin plus one of them; and since administration of isoniazid and P.A.S. is a relatively simple matter, we hoped that the introduction of this combination might prove to be the *turning-point in the control of tuberculosis* in countries *en cours de développement*.

Fig. 2—Contacts.

Where a younger patient is immobilised he becomes the focus of attraction for the neighbour's children. They are considered as contacts and vaccinated with B.C.G. "on the spot."

The patient is the young man in a white shirt, squatting.

Note the close proximity of huts, and the cleanliness of the children, in contrast to the amount of rubbish characteristic everywhere.

Between January, 1954, and May, 1954, a total of 550 patients were treated by this method at the Bangkok chest clinic; and *at least* half of the patients receiving the two drugs for two or three months (including those who continued physical work) said that cough and sputum had become slight or had disappeared. The recommended dose of 20 g. P.A.S. daily proved impracticable and had to be reduced to 16 g., or (in most cases) 12 g.; but the subsequent M.R.C. report [2] justified this smaller dosage. One could be pretty sure that the drugs supplied were taken, since, once he accepted medical advice, a poor Siamese or Chinese would follow it strictly.

Where isoniazid and P.A.S. did not fully control cough and sputum, and in the few cases where P.A.S. could not be tolerated, artificial pneumoperitoneum was induced at the chest clinic, provided that suitable arrangements could be made—e.g., if a car or ambulance could get near enough to the patient's dwelling to take him home, and if he could receive a certain amount of care at home. Though in Britain the use of artificial pneumoperitoneum has latterly declined, in areas such as Thailand, where the tuberculous patient can seldom rest for any length of time, it can still be an important adjunct to drug therapy, reducing cough, and a useful means of preventing extension of the disease after drug treatment has ceased. In the second year of the project 275 patients had an artificial pneumoperitoneum.

Few cases failed to respond to isoniazid and P.A.S. by mouth, or to these drugs supplemented by pneumoperitoneum. Unfortunately the time-limit set on our project prevented any statistical assessment of the value of these measures; but it was evident that patients receiving this treatment no longer required sputum-containers or toilet-paper handkerchiefs in increasing numbers.

Prevention by Conferring Immunity

The contact clinic.—This clinic, organised by the W.H.O. public-health nurse, was the first of its kind in Thailand. All contacts were tuberculin-tested, and (once the test proved unequivocal) negative reactors were vaccinated with B.C.G.: positive reactors under the age of 12 with clinical suspicion of abnormality, and those over the age of 12, were radiographed with a 70-mm. film.

In trying to ensure satisfactory attendance, the nurse encountered many obstacles. The elderly could hardly be persuaded to leave their homes for radiography; and, as the very old customarily looked after the very young, they were often a source of particular danger. Also distances were great in Bangkok, a city of bizarre lay-out intersected by numerous *klongs* (canals) which made short cuts impossible and caused congestion of traffic. Families were usually large and could not afford the fares to the clinic—especially when (as often) the mother was the breadwinner. Disruption of communications, by floods and quagmires, during the rainy season was another difficulty. Yet, with all this, the number of contacts attending the clinic steadily rose.

Where the contacts could not attend, we sometimes undertook tuberculin testing and B.C.G. vaccination in the patient's home. Any tuberculous person who was partially immobilised usually attracted a crowd of the neighbours' children, and, regarding these as contacts, we sought their parents' consent, and then tested and vaccinated them with the household members (fig. 2). Unfortunately, shortage of nurses and transport prevented

1. *Brit. med. J.* 1953, i, 521.
2. *Ibid*, 1955, i, 435.

our doing this on a large scale, but the need for going on with such work was impressed upon our Thai colleagues.

A B.C.G. campaign.—Parallel with these activities of the public-health nurse a B.C.G. campaign was started at the outset of the project. The first object was to test and vaccinate Bangkok school-children, but machinery had to be created for an eventual all-Thailand campaign of teaching and propaganda, and medical, nursing, and lay personnel had to be trained in the technique of testing, reading, and vaccinating. In eighteen months all Bangkok school-children were covered by this programme, though a proportion of children of school age who did not attend school were not at first included. Over 90% of all the negative reactors accepted vaccination. At the age of 15, 73% boys and 63% girls were already tuberculin-positive.

After the establishment of our B.C.G. team, in which lay vaccinators played an essential part, a mass campaign was launched; but when it had been in progress for over four months it was handed over to a newly appointed W.H.O. senior medical officer. At the time of transfer more than 233,500 children had been tested and nearly 84,000 vaccinated—i.e., 90% of the negative reactors. By June, 1955, this separate W.H.O./UNICEF unit had tested nearly 4 million persons, and vaccinated over $1^1/_2$ million. They found a much higher proportion of positive reactors in Bangkok than in the smaller towns and the countryside.

A small survey on the rate of conversion was undertaken by our project in September, 1952, on nearly 4500 children in the age-group 5–18, who had been vaccinated six to ten months previously. 81% were found to have converted to positive.

Preventive activities had to be carried into the patient's home, but the large number of nurses needed for such a purpose were not to be had: in fact, to recruit more nurses was a perpetual struggle. Home visiting was a trying and tedious job. Transport difficulties were enormous—buses overcrowded, *samlors* (the popular tricycle) dangerous, and the project's facilities wholly inadequate. Most of the patients' dwellings were far away from the main roads; often they could be reached only by a quarter of an hour's walk over cat-planks (fig. 3) or through muddy lanes. In the constantly hot and humid climate all this was bound to tire out any home visitor. Then there were "the baffling masses of houses and shacks with no sequence or complete lack of numbering, forming a bewildering topography," to quote the W.H.O. public-health nurse's report. Often the patient could be found only by mouth-to-mouth inquiry—which took a lot of time. Yet, to make preventive work effective, repeated visiting was essential. Nurses had to make friends with the patient and his family, who themselves were encouraged to spread the gospel of prevention. Much help was given to our project by the W.H.O./UNICEF maternal and child health project, whose nurses looked after the tuberculous in their area.

A monthly radiological survey of all pregnant women was made at the maternal and child health centre by our project's mobile X-ray unit. The tuberculous were given priority for admission to hospital.

PREVENTING THE BREAKDOWN OF LESIONS SEEMINGLY HEALED

Whereas prevention of primary infection was chiefly the concern of the public-health nurse and of the B.C.G. team, prevention of breakdown in those already infected was that of the social services. Among the patients attending the chest clinic, undernourishment and worry seemed to be the main causes of such breakdown. Houses were overcrowded, and vitality and resistance were low; public assistance was still rudimentary, and there were no monetary grants or food supplements. Because of financial stringency, our project was not granted an international social worker; but the medical social work expert of the maternal and child health project was able to tap a number of resources for tuberculous patients, thus affording material help to some of them. This showed that funds were to be had if one looked for them; and led to fuller recognition of social needs.

Treatment

Treatment was taught and practised under two main headings:

1. Simple procedures for reducing cough and sputum and "cooling down" an active lesion, and for managing tuberculous meningitis.
2. Major procedures for closing cavities and eradicating the tuberculous disease.

The simple procedures have already been described: they constituted the standard treatment for the out-patients of the chest clinic. The major procedures were confined to the Nonburi Tuberculosis Hospital, situated in the country, about 22 km. from the clinic.

By a happy chance an American thoracic surgeon, Dr. John Wilson,* had been assigned to the Washington University group attached to F.O.A., to teach in the Thai medical schools; and after several ward rounds with our team, he offered his help in alleviating some of the distressing complications.

Within two weeks a blood-transfusion service was organised, with medically selected inmates of the Bangkok prisons enlisted as donors. (No risks were taken with rubber tubings and bottles, new sets being employed every time, with the result that a few minor but no major reactions were recorded in our eighteen months' work.) Similar arrangements were made for electrolyte and fluid replacement. Instruments, anæsthesia apparatus, and other requisites were borrowed from various hospitals and ordered abroad by the government. The anæsthetist of Dr. Wilson's team, and his operating-room supervisor, gave the necessary assistance: one of the two resident medical officers was trained in anæsthesia and one nurse in operating-room technique.

A number of empyemas were relieved by drainage, and within a few weeks the first thoracotomy was performed—on a very ill woman who had had pain and discomfort from a plombage plasty with pingpong balls placed in her chest two years previously. This first major operation proved more difficult than was expected, but the result

* Now head of the surgical department in the medical school of the American University of Beirut

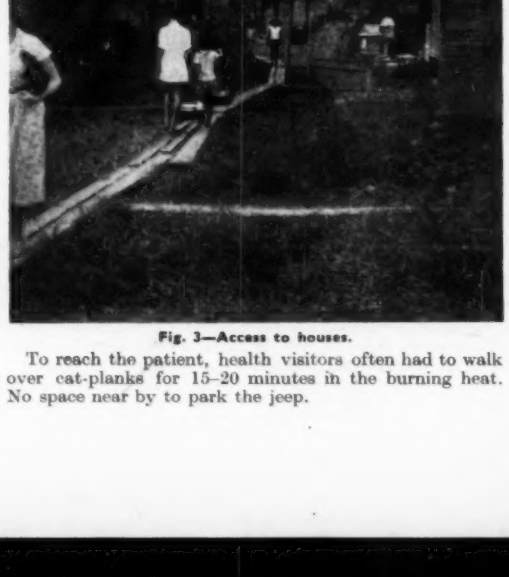


Fig. 3—Access to houses.

To reach the patient, health visitors often had to walk over cat-planks for 15–20 minutes in the burning heat. No space near by to park the jeep.

was encouraging. Two weeks later a pneumonectomy was done on a male teacher, with unilaterally advanced disease, in whom a previous thoracoplasty had failed. Both patients did well and were back at work long before our team departed. In the subsequent sixteen months other resections, as well as thoracoplasties, were undertaken—106 interventions in all, with 2 postoperative deaths.

Dr. Wilson completed the training of a Thai surgeon who had qualified in England and studied thoracic surgery for a brief period in the United States. By the time the American team left after ten months' work the latter was proficient in all major operations. The resident medical officer who had become familiar with the basic principles of anæsthesia prepared himself to go to the United Kingdom on a British Council scholarship. Postoperative adjustment of posture was practised by one of the Thai doctors following the manual of the British Association of Physiotherapists.

When our team began its spade-work at the hospital, where it was soon assisted by the American surgical group, there were only two Thai doctors in attendance. But their devotion, skill, and coöperation was exemplary. Besides taking part in the preparations for building up a surgical unit, attending to all the preoperative and postoperative care, and assisting with operations, anæsthesia, and transfusions, they carried a heavy load of nursing duties. Gradually, however, the medical staff increased from two to nine. More nurses were employed, especially aides, since well-qualified nurses were few and far between. A nurses' home was built. The small operating-theatre received modern equipment, the wards new beds and nursing requisites. A new two-storey hospital block for female patients was added to the bed space, now 130. A small hospital laboratory increased its scope. A modest electrocardiographic department was set up and a doctor was trained in the technique and in the common abnormalities, especially those associated with thoracic surgery. In short, the previous gloom gave way to cheerfulness: hope replaced despair and resignation. Coughing was rarely heard on the wards. Patients no longer wore masks—a depressing sight at first. The infection scare was dispelled and the "plague" stigma removed. Instead of wearing their daily clothing in hospital beds, as is common in the East, the patients now had light white garments.

Unfortunately, as there was no provision for rehabilitation, or for social assistance, only those with reasonable home conditions could be considered for major surgery. The Thai team recognised this shortcoming and agreed to set up a convalescent home, with retraining facilities, which would have had the additional advantage of relieving the pressure on hospital beds. Before the international team left, a convalescent home beside the hospital was being planned; but sudden budget restrictions imposed delay.

The Mass-radiographic Survey: Near Failure

"Random sampling" was the method chosen to investigate the prevalence of tuberculosis in Bangkok, and the United Nations statistician assigned to the Thai National Economic Council provided the samples. For this purpose, Bangkok was divided into several hundred areas. Of these twenty-four were selected at random for the radiological survey, which was to be combined with tuberculin testing and sputum examination (or laryngeal-swab cultures in the absence of sputum). House-to-house propaganda was prepared by sanitarians who explained that in no circumstances would the results be communicated to the employer. But, when an attempt was made to register names, difficulties at once arose. A large proportion of the population were Chinese, who lived under certain legal restrictions; and, fearing political implications, many of them resented an inquiry. It was then proposed to enlist Chinese helpers to explain; but the Chinese comprised at least three groups whose dialects were unintelligible to each other. Tuberculin tests and laryngeal swabs soon became unpopular, and had to be confined to the radiologically suspect. Finally —one of the greatest disappointments—the demographic information arrived rather late. However, before this sampling scheme was undertaken, group surveys had been made frequently in factories and big industrial concerns, and among port personnel and others.

Taking the group and sample surveys together, 16,000 adults were radiographed, and in 5% of these the findings suggested tuberculosis. But bacteriological confirmation was often impossible, for the collection of sputum was fraught with error and the setting up of laryngeal-swab cultures unsatisfactory because incubator space was insufficient at the time. All these hazards were aggravated by a succession of technical mishaps, more numerous and harder to overcome than was expected. A further year or two, at least, and the help of international personnel, would have been required to make this survey successful.

The case-finding programme will go on. Advice was given before departure to continue the monthly survey of maternity cases at the maternal and child health centre and to refer to the chest clinic those with a pulmonary lesion.

Teaching and Training

From the beginning we realised that little would be gained by ex-cathedra teaching in English; and throughout our two years we taught only individuals or small groups, in question-and-answer fashion. This kept tuition alive, allowed time for repetition and interpretation, encouraged thinking and free discussion, and eased tension and embarrassment. The teacher could soon tell whether he was understood and distinguish between the capable and those who took longer to comprehend. This vast project, with a life-time of a little more than two years, had in the first instance to make use of the ablest and train them to be teachers themselves. Standing rules of the team were to eschew speculations and unproven statements, to refrain (above all) from talking down to the students, and yet to be firm and critical.

Of the medical subjects taught, two were given priority: first, consideration for the patient's comfort; and, secondly, prevention and management of therapeutic catastrophes.

1. Wherever opportunity arose, attention to the very sick was impressed on medical and nursing staff. Many Thai doctors were as eager as those of other nations to give injections when the real need was comfortable recumbency and fluids. One could not emphasise too strongly the importance of combating pain by simple means, and the benefit of a local anæsthetic for minor interventions—using sharp needles. How to lift, how to feed, and how to give a drink to an immobilised patient were simple but indispensable demonstrations.

2. As tension pneumothorax, empyema, failed surgery, and other complications were at first encountered in considerable numbers, there were opportunities for analysing the causes of failures and the means whereby they could be put right. The importance of fluid and electrolyte replacement and of simple sedation was brought home to the medical staff time and again.

Diagnosis and differential diagnosis of chest conditions was taught in two sessions (to medical staff and visitors) on weekly selected radiological material with all the bacteriological, clinical, and social information. Stress was laid on the pathology of the lesion and on the planning of the stages of treatment. Each case was also considered in all its preventive aspects, the home visitor often being called to the conferences to supply information and receive instructions. Moreover, a two-hour teaching ward round was held once a week in which for more than eight months the American thoracic surgeon always joined. Since one was adamant in requesting all the necessary examinations and tests, reports on precautionary measures in the homes, and accurate charts, these ward rounds elicited fruitful discussions, and with many other conferences they became a forum of happy team-

work between Thai, American, and W.H.O. medical personnel.

During two terms medical students, in groups of ten, were instructed on how to suspect, diagnose, and prevent tuberculosis, and on first-aid management of the emergencies of the chest. It proved more difficult to impart modern knowledge on diagnosis and prevention to undergraduates than to postgraduates, since their professors still put their emphasis on physical signs, hardly considering prophylaxis at all. They were also encouraged to spread the gospel of prevention among their own folk and to put it into practice by each taking an interest in three or four tuberculous families. Unfortunately, the departure of the international team did not allow this important scheme to be pursued.

Whereas most of the above responsibilities were carried by the team-leader, a large teaching programme was also covered by the W.H.O. public-health nurse. Besides instructing the four to six nurses of her own office individually, she gave courses to student nurses of various hospitals, public-health supervisors of rural areas, municipal nurses, midwives, and sanitarians—with practical demonstrations at the clinic and during home visits. The reading of 70-mm. films was demonstrated to small groups of doctors by the W.H.O. epidemiologist, who also organised a mass-radiographic survey, supervised the technique of B.C.G. vaccination, helped to build up the B.C.G. campaign, and evaluated the figures with his counterparts. The statistician trained two young lay persons, with degrees in mathematics, in comprehensive charting and the principles of medical statistics.

On the whole it proved rather difficult to impart theory to technical personnel. For example, the local radiographers had not had schooling of a standard enabling them to comprehend elementary physics, and one had to be content with their technical skill and satisfactory photography.

Results of Teaching and Training

Diagnosis.—When we left, a medical staff of nine were skilled in the diagnosis of tuberculosis and other common chest conditions in so far as the potentialities of the laboratory allowed. Four doctors were conversant with the interpretation of 70-mm. films within the normal range of over-reading and under-reading. The bacteriological study of tuberculosis was in the competent hands of the bacteriologist-in-charge and two reliable technicians, and several technicians were in training. The routine examinations of sputa, taking laryngeal swabs, the preparation of media, the setting up of cultures, sensitivity tests, and (above all) the precautions for sterile handling of material, were under control. Three technicians had become accomplished in radiographic technique and two doctors in bronchography and bronchoscopy.

Prevention.—All the medical staff and the small staff of nurses understood the meaning of prevention and the importance, to that end, of combating cough and sputum.

Treatment.—More than ten doctors had full knowledge of routine procedures and of the diagnosis and management of the emergencies of the chest. There was one fully trained surgeon with more than 60 major interventions, resections, and 'plasties (without any fatality) to his credit, and a sufficient number of doctors to assist, including one acquainted with the principles of anæsthesia. No major transfusion accidents had occurred and no postoperative abnormalities of posture. On the medical side the following case-histories may illustrate the standard of responsibility attained:

(1) A tuberculous diabetic with ketonuria, tension pneumothorax, and empyema left the hospital with his diabetes controlled, his chest cleared of pus, the lung almost re-expanded, and the residual pleural space obliterated by thoracoplasty. His sputum had been freed from tubercle bacilli and his weight increased by 7 kg.

(2) A woman of 21, seven months pregnant and seriously ill with typical miliary tuberculosis, had complained of severe headache. The cerebrospinal fluid was characteristic of tuberculous meningitis. With standard treatment her symptoms and her fever had long subsided, the cerebrospinal fluid had become normal, save for the number of cells (56 per c.mm.), when she was delivered of a healthy child. The baby was immediately segregated and after four weeks was vaccinated with B.C.G. Treatment of the mother continued until her condition was stabilised.

In the past, the presence of a tuberculous lesion was almost always regarded as an indication for ending pregnancy. But when our Thai colleagues understood that all children are born free of tuberculosis, and a scheme for treating the mothers and segregating and vaccinating the newborn was put into operation, the previous policy was abandoned.

Retrospect

Was this particular project in Thailand justified?

All three participants invested considerable funds. UNICEF generously furnished a laboratory with modern apparatus, sent a mobile radiographic unit, a radioscope, and all the requisites for a mass-B.C.G. campaign (including a number of vehicles), and ensured a continuous flow of chemicals, radiographic film material, tuberculin, B.C.G. vaccine, and a number of other items, even after our departure. W.H.O. provided the experts and repeatedly sent special advisers, also supplying some apparatus, instruments, and literature. The Thai Government fulfilled all its obligations with regard to buildings: with reasonable speed it completed a two-storey laboratory, an extension to the chest clinic allowing separation of infectious and non-infectious patients, a new hospital block, and a nurses' home; and it commenced and planned a number of other buildings. It procured high-quality radiodiagnostic apparatus and modern instruments for thoracic surgery. The hospital wards were reconstructed and newly furnished. The government also provided all the counterparts to the international personnel, and an additional staff of drivers, motor mechanics, technicians, doctors, and nurses.

Among the Thai personnel there were able and talented doctors, nurses, and technicians; but salaries were generally low. As a government division, the tuberculosis project could not create a precedent in this matter, and the head of the tuberculosis division could certainly not be blamed for the failure to satisfy various social needs of his staff. But technicians—especially radiographers trained by W.H.O. personnel—were in constant demand elsewhere, and many public-health nurses and doctors had to do private practice to earn their living, particularly since most of them had large families. This also accounted for a great deal of absenteeism of the nurses.

Nevertheless a tuberculosis control project, with diagnostic, preventive, and curative sections, was established, and staff were trained sufficiently for each section to carry on the work: indeed the facilities for diagnosis and prevention would have been the envy of many a Western tuberculosis service. Moreover, interest in the fight against tuberculosis has been aroused, both in the population and in the medical profession. This is reflected in the fact that, a year after the W.H.O. team's departure, attendance at the chest clinic had doubled, the chief of the tuberculosis division had been given a teaching appointment for tuberculosis at one of the medical schools, and frequent demonstrations on clinical and pathological chest material were being held by the Thai Medical Association. Modern standards of diagnosis, prevention, and treatment of tuberculosis are for the first time systematically attained in the country. The project's laboratory has become the expert centre for

other hospitals and medical schools, and consideration and care for the sick is propagated in pursuance of the W.H.O. team's teaching.

Hence the answer to my question "Was it justified?" is "Yes"—though with reservations. The period of a little more than two years was much too short a time in which to complete and consolidate the work. Though several doctors, nurses, and technicians were adequately trained, there was still a difference between those who had been trained and those who were ready to assume responsibility—and the latter were not numerous. Every project needs a trial period during which criticism must be allowed though it may necessitate staff changes on either side. Many Thai members had joined in the hope of eventually gaining a W.H.O. fellowship abroad; and when this hope faded they had no special incentive left. It was recognised too late—after all possible efforts had been made, and temporary improvement achieved—that we could not hope to secure the services of a sufficient number of qualified home-visiting nurses. This state of affairs called for a change of policy. A health-education programme should have assisted the campaign of prevention. The first steps towards this end were taken by instructing students, and similar activities were in preparation; but time was too short for the scheme to be pursued. Health education could have done much; for, from the public-health point of view, the bodily cleanliness of the people—even of the poorest and their children—was an important asset. On the other hand their canals were dirty, and their environmental sanitation deplorable.

"IF I WERE . . ."

"If I Were Team-leader" again of a tuberculosis control project, with the same facilities at my disposal, I would follow essentially the same pattern of planning for diagnosis and prevention and again aim at incorporating the tuberculous patient as a useful member of the family to which he belongs. But I would ask my headquarters to consider the following points:

1. Do not start a project until all the necessary equipment has arrived.

2. Engage international staff in good time and arrange for language lessons pertaining to the country of assignment.

3. Impress on the government the need to select able counterparts, because they will have to be the teachers of the future.

4. Do not send a team without clerical help to a country where English is not the basic language.

5. See that sufficient transport is available, assess the requirements for health visitors, and double the number of vehicles required by them. Without satisfactory transport a domiciliary service in a hot climate cannot work and exhausts its members.

6. See in time that the government is prepared to pay a good salary to drivers. Bad drivers quickly ruin the cars.

7. Allow doctors and nurses to drive vehicles, and insure them.

8. Make sure that the government is willing to pay adequate salaries to technicians and nurses; for a project stands or falls by their skill, reliability, and devotion.

9. If after a certain period it emerges that nurses cannot be recruited for a tuberculosis project and salaries and amenities remain unsatisfactory, one had better prepare for a health-education programme in good time by employing lay personnel in large numbers on the model of a mass-B.C.G. campaign.

10. A tuberculosis project must have a social worker who will collect facts and figures, arrange for assistance and rehabilitation, and tap new resources.

11. Impress on the government not to spend money on any major building programme until sufficient medical, nursing, and technical staff are trained. One should expand in a cautious way, gain experience until the time when all requirements are clear, and then begin to make plans.

12. Prepare convalescent homes with retraining facilities for the patients. Such a scheme will also help to relieve pressure on hospital beds. Convalescent homes can be administered by less qualified doctors and nurses.

13. Where tuberculosis is widespread, arrange early for children's wards for the treatment of tuberculous meningitis, miliary infections, and infections of adult type.

14. Never again embark on a tuberculosis control project of only two years' duration.

Conferences

ATLANTIC CITY MEETINGS

FROM A CORRESPONDENT

THREE important meetings are held annually in Atlantic City in the spring. They are the gatherings of the American Federation for Clinical Research, the American Society for Clinical Investigation, and the Association of American Physicians. This year the weather was kind and the boardwalk crowded between meetings. Brief reports of a few of the papers follow; full reports will be published later in the journals of the respective societies.

Studies on the L.E.-cell phenomenon were reported by N. B. KURNICK. He concluded that the abnormal factor present in the γ-globulin of these patients alters the cell membrane so as to allow entrance of a serum proteolytic enzyme, which then destroys the inhibitor of desoxyribonuclease (DNase). This enzyme then attacks the chromosomes, yielding the depolimerised nuclear mass which characterises the L.E. phenomenon. He treated 16 patients with homologous whole blood (or leucocyte homogenates) intramuscularly, thus providing material which may either supply DNase inhibitor or adsorb circulating abnormal γ-globulin (or both). Encouraging results were seen, and steroids could be withdrawn in almost all cases.

J. A. MOORHOUSE and R. M. KARK reported their observations on the effect of tolbutamide (orinase) on blood-sugar levels during continuous feeding with first glucose and then fructose. With glucose no effect was seen, whereas blood-sugar levels fell promptly with fructose. They concluded that a primary effect of the drug on the liver had been demonstrated, and that the data did not support a direct tissue action.

G. W. LIDDLE, J. E. RICHARD, and G. M. TOMKINS gave an account of the biological effects of a new series of corticosteroid analogues, in which carbon 2 is methylated. By this means the effects were greatly enhanced; the most potent member of the group (2-methyl-9-alpha-fluorohydrocortisone) was three times as powerful as aldosterone, and the most effective mineralocorticoid yet described.

C. J. FISHER and W. W. FALOON showed that blood-ammonia levels in liver cirrhosis can be controlled by giving 12 g. of neomycin orally daily. This dose prevented mental effects, and allowed more protein to be given in the diet.

A useful test for steatorrhœa was described by J. WENGER and E. C. TEXTER. They made a single determination of the blood-carotene level, and showed its relationship to the 24-hour fæcal fat excretion. It seems clear that, provided the carotene intake prior to the test is adequate, low levels imply some defect of fat absorption. The simplicity of the procedure may make it a useful screening test for steatorrhœa, and an easy means of following the course of the disease.

The first case of pyridoxine-responsive anæmia in the adult was recorded by J. W. HARRIS, J. M. PRICE, R. M. WHITTINGTON, R. WEISMAN, and D. L. HORRIGAN. It appeared as an apparently unresponsive iron-deficiency anæmia, without tongue or nerve involvement, and with no skin changes. Hæmatologically the essential lesion was a reduced mean corpuscular hæmoglobin concentration with raised serum-iron level. Pyridoxine hydrochloride (200 mg. intramuscularly daily for five days) produced prompt remission, with a reticulocytosis of 50·8% on the seventh day. After relapse had been allowed, it was shown that a similar but much less striking remission could be obtained with pyridoxine orally. A specific defect in absorption of the vitamin was suggested as the cause.

J. B. FIELD and DE WITT STETTEN described studies on insulin resistance during diabetic acidosis. They showed that the quantity of insulin required to save the patient was proportional to the concentration of a serum factor which inhibited the uptake of glucose by the isolated rat diaphragm. Further observations on one case located this factor in the α-globulin fraction; no adrenal or pituitary effect could be detected.

K. J. ISSELBACKER, E. A. ANDERSON, and H. M. KALCKAR demonstrated unequivocally that the essential lesion in galactosæmia is an absence of a specific intracellular enzyme, phosphogalactose transferase.

R. H. ROSENMAN, S. O. BYERS, and M. FRIEDMAN reported work on anti-kidney-serum-induced nephrosis in rats. By preventing the external loss of urine they showed that hyperlipæmia and hypercholesterolæmia did not occur and, if urine loss was permitted, could be reversed by the continuous intravenous infusion of plasma-albumin. R. M. KARK supported this by reporting 3 patients in whom the intravenous administration of salt-free albumin reduced the serum cholesterol and cholinesterase activity.

At the meeting of the Association of American Physicians, C. A. JANEWAY described an arthritic syndrome in children with agammaglobulinæmia. It was a polyarthritis, always involving and usually beginning in the knees, and going on to involve the middle-sized joints. Characterised by intermittent hydrarthrosis, it eventually led to chronic changes in the joints. The syndrome was independent of any treatment received, and its ætiology was obscure.

An interesting account was given by I. L. BENNETT and his associates of an outbreak of pseudomembranous enterocolitis in chinchillas. This was due to pathogenic staphylococci and promptly disappeared when aureomycin, which had been added as a growth-promoting factor, was removed from the diet. A section was shown from the bowel of a patient who died in 1893 from pseudomembranous enterocolitis. Appropriately stained, groups of staphylococci and superficial necrosis, very similar to the chinchilla's lesions, were clearly visible.

Data on a stilbene-like compound (amphenone) were presented by R. HERTZ and his colleagues. This substance was shown effectively to suppress adrenocortical activity, but was unfortunately a powerful narcotic. Prolonged search has so far failed to reveal non-toxic analogues.

W. B. SHELLEY and others described studies on the neurophysiological basis for itching. They showed first that only certain spots on the skin can feel an itch. They were about 1 mm. in diameter, 1–2 mm. apart, and localised in the dermis. Further work showed that the sensation was caused by proteolytic enzymes, of which a number of examples, including trypsin, were given. No structural changes were observed.

J. E. HOWARD reported preliminary studies on a functional test for the detection of hypertension produced by one kidney. The method used was to collect urine separately from each ureter, and to estimate its sodium content. The concentration of sodium was lower in the urine from the affected kidney.

Federation of Experimental Biologists

The Federation includes physiologists, biological chemists, pharmacologists, experimental pathologists, nutrition experts, and immunologists, and in the joint proceedings, also at Atlantic City last month, we were offered 2071 papers read in full (and a number of others by title only) in five days.

The most significant papers were probably those recording synthesis of a virus by W. M. Stanley, H. L. Fraenkel-Conrat, and R. Williams,[1] of the California Institute of Technology. They took two strains of the tobacco mosaic virus (a and b), broke them into two parts, one protein and one nucleic acid (a_1 and a_2, b_1 and b_2), and then reconstituted them as two new viruses (a_1 and b_2, b_1 and a_2). They went on to show that not only were the reconstituted viruses infective, whereas the fragments were not, but that many of the important qualities of the virus resided in the helical-shaped nucleic acid.

A series of joint sessions was devoted to atheroma. J. P. Strong and his associates showed that subintimal fatty deposits were always present in human aortas by the age of 3 years, and that the rate of infiltration is greatest between 5 and 15 years. T. M. Lin and his colleagues reported studies on 9 healthy subjects fed on standard diets supplemented by varying amounts of pure cholesterol. They showed that, although absorption increased as the total dietary cholesterol increased, the blood-levels remained remarkably constant. D. W. Petersons and his co-workers, however, showed that blood-cholesterol levels could be reduced by adding about 5·7 g. of soy sterols daily to a normal diet; this could be concealed in butter, was quite tasteless, and produced falls of 11% or greater in blood-cholesterol. J. W. Hahn and M. A. Nyman found that whole blood was capable of considerable synthesis of free cholesterol, phosphatides, and fatty acids when passed through a glass cannula, and that this effect was enhanced if a living aorta was substituted for the glass tube, implying some lipid synthesis by the aorta itself.

Two papers with immediate clinical application are mentioned from the excellent series on blood-clotting. A. J. Quick reported a case of a woman of 22 with a history of mild bleeding since childhood and two severe postpartum hæmorrhages. After the second, he found a normal platelet and prothrombin level, but clotting was indefinitely prolonged, and the thrombin time was 43 seconds (normal 3 seconds). He attributed these findings to hyperheparinæmia, and he was able to produce a similar picture by injecting papain into the rabbit. D. P. Jackson and his colleagues reported severe abnormalities of blood coagulation after hæmolytic transfusion reactions in 2 patients. In both there were hypofibrinogenæmia, hypoprothrombinæmia, and thrombocytopænia and in neither was there evidence of fibrinolysis. One patient had reduced ac-globulin activity and plasma thromboplastic component, and a circulating anticoagulant in low titre. The picture could be reproduced in experimental animals by injecting thromboplastic substances, and it was suggested that the disorder followed the release of such a substance from lysed red cells.

In the section on kidney diseases R. C. Mellors and L. G. Ortega gave a fascinating account of the localisation of γ-globulins in the kidney in human nephritis. Using an ingenious technique they were able to show that, whereas there is no γ-globulin in sections of normal kidneys, or in a variety of other conditions (e.g., infarcts, pyelonephritis), γ-globulin is present in acute hæmorrhagic glomerulonephritis and in chronic membranous glomerulonephritis, but it is confined to the glomerulus.

These and many other papers are summarised in the *Federation Proceedings*.

1. See *Lancet*, April 21, 1956, p. 490.

Personal Papers

EYE-WITNESS AMONG THE EUGENISTS

THE other day I turned up an early manuscript of my own, written some sixty years ago, which describes the first public meeting of the then embryo Eugenics Society. As a medical student I enjoyed the meeting so much I lost no time in writing this detailed report. For reasons that may be evident it has not hitherto been published.

A short time ago many learned people met together in London to discuss the "Improvement of the Race," or, as the subject has recently been christened, the Science of Eugenics. A casual enquirer after truth had inadvertently come into possession of a ticket of admission and was fortunate enough to be present at the meeting.

The audience was composed of both sexes, and, in view of the subject under discussion, presented an interesting spectacle. Healthy young men and women, parents of the next generation, in whose hands lay the immediate steps towards improvement; and to whom the meeting might be of some practical import, were singularly lacking. In their place were the old and decrepit, the halt, the blind, and the lame. Hardly a

woman under forty was present, and the overpowering majority either wore spectacles or had some other more or less conspicuous physical defect. One poor gentleman came in on crutches; another had the rolling eye of "inherited tendencies"; and the little linen that was present was evidently on enforced leave from the wash-tub.

At first the "casual" thought the audience had collected itself as an outward and visible sign of the dire necessity for "improvement"; and as a protest against the sins of their fathers who had taken no heed of the matter. But, as the meeting advanced, and the view was delicately unfolded that marriages should be made with an eye more to the physical development of the race than to wealth, or beauty, or love, the "casual" found that he was grossly mistaken—the audience was there to protest against any interference with their individual freedom in matters of love and marriage. One gentleman of ninety-odd emphatically, and with many a senile tremor declared to his junior by a decade "we are not going to marry to please the State, but to please ourselves." Another gentleman from the audience bounded on to the platform and with a tongue which sadly needed the agility of his toes, stammered that so long as there was "L-l-l-l-love in the w-w-w-w-world l-l-l-l-love w-w-w-w-would l-l-l-l-laugh at l-l-l-l-locksmiths."

The sides of the few complete men and women who were present now began to ache. But that ache was nothing to the acute agony to which they were soon put at the hands of no less a person than the very celebrated professor, the man of science and world-wide fame, who for more than half a century has been the brightest star in matters anthropological, and whose paper on "Eugenics" it had been the object of the meeting to hear.

The professor has a face of serene calmness and philosophical divinity, and his expression is one of angelic graciousness. No more than a glance is needed to recognise that he is not as other men. As the disembodied soul is to common clay, so is Professor Galton to the rest of humanity.

That is what the casual enquirer thought. After several male members of the audience had appeared upon the platform to criticise the "able and interesting" paper which the professor had read, a lady rose. She was past the bloom of life and wore a large hat and spectacles.

The professor bowed and courteously bent his head in the direction of the lady. But a cold, together with the changes which years are prone to work in the auditory canal, had impaired his hearing powers to such an extent that listening was palpably an effort, and he soon gave up the attempt and leaned back in his chair. On the professor's left sat a young man, already known to fame, and to him the great man turned—and then the audience occupying the few front rows of chairs were electrified, petrified, and almost electrolysed, by hearing his dulcet tones form the words "Fancy having a wife like that!"

The young man blushed. The chairman turned a horror-struck countenance on the professor. The lady paused. The professor was the only unconcerned person on the platform. He turned his divinely imperturbable face towards the chairman as though he would ask "Has she said anything very dreadful?" For one brief second the quivering silence lasted, and then (to her everlasting honour be it said) the lady resumed her remarks as though there had been no interruption.

The paper of the learned professor had proved beyond the possibility of a doubt that men and women were perfectly ready to be influenced in their choice of each other by "Eugenics." But amongst the many arguments which were advanced against this theory there was none so overwhelming in its conclusiveness as those six little words which slipped so naturally from the professor's own lips. "Fancy having a wife like that."

When the Man of Science judges by appearances what is the Man in the Street to do?

K. HEANLEY
L.M.S.S.A.

Special Articles

IODINE AND FLUORINE

THE nutrition panel of the food group of the Society of Chemical Industry held on April 11 the fourth and final meeting of a series concerned with Nutritional Requirements and Food Fortification.[1]

Iodine

Prof. MARGARET MURRAY said that iodine had been recognised as a nutritionally essential element since Baumann in 1896 prepared "iodothyrin" from the thyroid gland and it was shown that its iodine content ran parallel with its physiological activity. The iodine of the diet, which was mainly in the form of iodide, was taken up by the thyroid cells for the production of thyroxine and tri-iodothyronine. An inadequate intake of iodine led to thyroid dysfunction and goitre. Because iodine was not abundant in foods generally, its level in drinking-water determined the adequacy of its supply. Although inadequacy of iodine was the ultimate cause of most endemic goitre, other dietary factors, present in particular in the brassicæ, could act as goitrogenic or anti-thyroid agents. In addition calcium could be goitrogenic. The iodine requirement of man had not been accurately determined but was generally accepted as 100 μg. per day. The iodine of drinking-water was a critical factor in achieving this intake and 5 mg. per litre was regarded as an adequate level.

Mr. J. C. M. HOLMAN discussed the use of iodised salt for goitre prophylaxis. He emphasised that iodine must not be regarded as a cure for established goitre but largely as a prophylactic. Many methods for goitre prevention had been tried including the use of iodised salt, the addition of iodine to water-supplies, the administration of iodised tablets and sweets to school-children, and the application of iodine-rich fertilisers to vegetable crops. Of these methods the iodisation of salt was the most satisfactory and had now been practised for over thirty years. Remarkable decreases in goitre incidence had followed the introduction of iodised salt in many countries, including the U.S.A., Switzerland, New Zealand, Colombia, and Poland. No adverse effects had been observed. In Britain iodised salt was available but not yet compulsory, although the Government had announced in 1950 its intention to implement the recommendation of the Medical Research Council that all free-running salt in domestic use should contain 1 part of potassium iodide in 40,000 parts of salt. Iodide added to salt was stable for over two years if the salt was kept dry and free-running and contained a stabilising agent. The desirable level of iodisation was determined by the average intake of salt and the average dose of iodine necessary to prevent goitre in a community. There was accordingly wide variation, from 1 in 10,000 parts to 1 in 200,000 parts of salt, in different countries.

In reply to a question on the possibility of iodisation leading to excessive intakes of iodine, Professor MURRAY pointed out that the levels used in fortification were far lower than those naturally in sea-foods; there was no evidence that iodisation constituted a danger.

Fluorine

Professor MURRAY remarked that fluorine had not been shown to be essential for animal nutrition since no fluorine-free diet had yet been obtained. Fluorine was found in varying amounts in the calcified tissue of the body, the amount increasing with age and fluorine intake. Fluorine also accumulated in fossil bone and teeth, and the estimation of fluorine in fossils was an accepted method of dating them. Fluorine was also present in the ash of kidney stones. One of the chief sources of fluorine was drinking-water. Most water-supplies in Britain contained less than 1 part of fluorine per 1,000,000, but there were several places with values of 2–3 parts per 1,000,000. In such areas the intake might amount to 3–4 mg. daily from water. The only foods rich in fluorine were sea-foods and tea. The toxic level of intake of fluorine depended on its absorption and the efficacy

1. See *Lancet*, 1955, ii, 1184; *Ibid*, Jan. 7, 1956, p. 39.

of elimination by the kidneys. In the neighbourhood of many industrial undertakings fluorine-containing dusts and smokes were known to cause severe animal intoxication and could also increase the intake of the human population. Retention took place to a harmful level in bone; this was accompanied by osteosclerosis and caused calcification of tendons and ligaments. Fluorine was well known as an enzyme inhibitor, and the kidneys seemed to show the greatest sensitivity to toxic levels of fluorine with resultant cytological and structural changes. In addition it had an inhibitory effect on gastric acid secretion, and people exposed to fluorine in the cryolite industry commonly complained of gastric symptoms.

Dr. G. WYNNE-GRIFFITHS pointed out that a characteristic effect of fluorine intoxication was osteosclerosis, the laying down of new bone, and the calcification of associated structures that did not normally calcify except in old age. Not all persons long exposed to fluorine developed these signs of fluorosis, and even when radiographic signs were present function might be unimpaired. The weight of evidence suggested that there was no connection between fluorine and goitre. The fluoridation of drinking-water at 1 part per 1,000,000 apparently presented no hazard to human health, but further information was required about the extent to which the damaged kidney and the senile kidney could excrete an enhanced intake of fluorine.

Miss J. R. FORREST said that fluorine 1 part or more per 1,000,000 in the drinking-water had been shown to reduce the incidence of dental caries, while high concentrations were associated with unsightly enamel defects. In Maldon, Essex, where, until recently, the fluorine content of the water had been 5 parts per 1,000,000, there was very much less caries among children, both in the permanent and the deciduous teeth, than in any other part of the country. In South Shields, where the fluorine content was 1·4 parts per 1,000,000 of the water, the incidence of caries among children had been shown to be 45% less than in similar groups in the neighbouring fluoride-free area of North Shields. In general there was a correlation between the incidence of caries and the fluoride content of the water. The maximum reduction of caries was observed in those children who had consumed the water from birth to about 7–8 years of age. Fluoride was a natural constituent of all teeth, and the amount present in the enamel and dentine was related to the concentration in the water-supply. The mechanism by which the ingestion of fluoride reduced dental caries was not known, but the most acceptable theory was that the fluoro-apatite formed in the tooth was more resistant than the normal tissue to the acids produced by carbohydrate fermentation in the mouth. With high concentrations of fluoride in the water mottled enamel, or dental fluorosis, resulted; these teeth were less prone to caries. Severe mottling was accompanied by severe hypoplasia and widespread brown staining. The first fluoridation studies, started in 1945 in parts of the United States, showed that caries had been gradually and steadily reduced compared with control areas. After ten years of fluoridation in Newburgh, N.Y., caries was 57–58% less than in the control area. Similarly, in the first permanent molars, generally considered to be the most vulnerable teeth in childhood, the average number of decayed, missing, and filled teeth per child was 53% less. The beneficial effect of fluoridated water was not limited to those children who consumed it from birth; a reduction of caries was observed in older age-groups (13–14-year-old children). Fluoridation was about to be introduced in four areas of the United Kingdom—Anglesey, Andover, Kilmarnock, and Watford. Comparable control areas had been selected. To determine the optimum level of fluoridation a study was made in four areas where fluoride occurred naturally at concentrations of 5·8, 3·5, 2·0, and 0·9 parts per 1,000,000, and in two areas where the fluoride content was not more than a trace. The incidence of caries decreased with increasing fluoride concentration up to 3·5 parts per 1,000,000. The incidence of severe mottling was directly related to the amount of fluoride in the water, becoming negligible at the 0·9 parts per 1,000,000 level. The optimal level of fluoride in water seemed to be about 1 part per 1,000,000.

Mr. J. LONGWELL said that in the U.S.A. sodium fluoride, sodium fluorosilicate, or hydrofluorosilicic acid was commonly added to water. Several common methods of water treatment removed the fluoride from solution; it was therefore added at the last stage—namely, before chlorination. A saturated solution of sodium fluoride was injected at this stage into the pumping main at a controlled rate.

In the discussion Mr. A. E. BENDER, PH.D., asked whether it was true that there was a difference in the caries-rate in the upper and lower teeth owing to the rinsing of the upper teeth in fluoride-containing water. Miss FORREST replied that the upper teeth usually decayed more rapidly than the lower, and that the molars showed more caries than the incisors.

REGIONAL HOSPITAL BOARDS AND BOARDS OF GOVERNORS OF TEACHING HOSPITALS

THE Minister of Health has appointed, or reappointed, the following as chairmen of boards:

Sheffield Regional Hospital Board.—A. V. Martin.

East Anglian Regional Hospital Board.—Earl of Cranbrook, C.B.E., J.P.

North West Metropolitan Regional Hospital Board.—Hon. John Freemantle, T.D., M.A.

South East Metropolitan Regional Hospital Board.—K. I. Julian, C.B.E.

North East Metropolitan Regional Hospital Board.—S. G. Rowlandson, M.B.E., J.P., F.C.A.

South Western Regional Hospital Board.—Sir Havergal Downes-Shaw, O.B.E.

Welsh Regional Hospital Board.—Sir Frederick Alban.

Manchester Regional Hospital Board.—N. M. Agnew, B.A.

Liverpool Regional Hospital Board.—T. Keeling, C.B.E., M.A., J.P.

United Bristol Hospitals.—Colonel H. B. Stokes, M.B.E., B.A., J.P.

United Liverpool Hospitals.—T. Keeling, C.B.E., M.A., J.P.

Royal Free Hospital.—Hon. P. Samuel, M.P.

University College Hospital.—Sir Alexander Maxwell, K.C.M.G.

Hospital for Sick Children.—C. A. Lucas, T.D., M.A., A.C.A.

Royal Marsden Hospital.—J. M. Wallace.

Queen Charlotte's and Chelsea Hospital.—A. J. Espley, C.B.E., J.P.

Eastman Dental Hospital.—A. D. Page.

REGIONAL HOSPITAL BOARDS

The following doctors have been appointed or reappointed to regional hospital boards. They will hold office till March 31, 1959. New appointments are indicated with an asterisk.

Newcastle.—S. Whately Davidson, R. B. Green, R. G. Russell.

Leeds.—Ralph Watson.

Sheffield.—Ralph Lodge, Duncan Macmillan, G. L. Roberts.

East Anglian.—M. W. B. Bulman, Captain E. Murray-Harvey, *K. W. Mackenzie.

North West Metropolitan.—A. Staveley Gough, Esther Rickards.

North East Metropolitan.—Louis Comyns, Victor Dix.

South East Metropolitan.—A. Talbot Rogers, E. R. Boland.

South West Metropolitan.—C. J. Grosch, H. H. Langston, Louis Minski.

Oxford.—A. R. Banham, J. A. Stallworthy.

South Western.—L. W. Hale.

Welsh.—O. H. Williams, * A. Trevor Jones (till March 31, 1957).

Birmingham.—C. F. V. Smout, F. W. Marshall.

Manchester.—A. D. Macdonald, Harry Pigott, Arthur Pool.

Liverpool.—Sir Henry Cohen, Sir Arthur Gemmell, S. Barton Hall.

BOARDS OF GOVERNORS

The following doctors have been appointed or reappointed to boards of governors.

St. Bartholomew's Hospital.—Sir Geoffrey Keynes, O. S. Tubbs, * E. R. Cullinan.

London Hospital.—D. W. C. Northfield, * R. R. Bomford.

Royal Free Hospital.—Esther Killick, J. D. McLaggan, A. Clifford Morson, * F. P. Lee Lander.

University College Hospital.—D. R. Davies, E. A. Gregg.

Middlesex Hospital.—A. Clifford Morson, B. W. Windeyer, * R. S. Handley, * J. P. Monkhouse.

Charing Cross Hospital.—* N. S. Plummer, * K. Shirley Smith.

St. George's Hospital.—T. Crawford, M. F. Nicholls, V. H. Riddell.

Westminster Hospital.—Ralph Coyte, C. J. Gavey, Sir Geoffrey Todd.

St. Mary's Hospital.—G. L. M. McElligott, Esther Rickards, * C. A. Young, * D. Hamilton MacLeod (till March 31, 1957).

Guy's Hospital.—T. B. Johnston, W. R. Spurrell, F. S. Warner.

King's College Hospital.—Ralph Cocker, * J. L. Livingstone.

St. Thomas's Hospital.—R. H. Boggon, Frank Cook, J. S. Richardson.

Hammersmith, West London, and St. Mark's Hospitals.—Ian Aird, C. M. Fletcher, R. H. Franklin.

Hospital for Sick Children.—I. A. B. Cathie, G. H. Macnab.

National Hospitals for Nervous Diseases.—Macdonald Critchley, Harvey Jackson, * Terence Cawthorne.

Royal National Throat, Nose, and Ear Hospital.—F. C. Ormerod.

Moorfields, Westminster, and Central Eye Hospital.—F. W. Law, * E. F. King.

Bethlem Royal and Maudsley Hospital.—G. W. Harris, A. J. Lewis, * A. D. Leigh.

St. John's Hospital for Diseases of the Skin.—F. R. Bettley, G. M. Frizelle, S. C. Gold.

Hospitals for Diseases of the Chest.—A. Hope Gosse, Lieut.-General Sir Bennett Hance, F. H. Young.

Royal National Orthopædic Hospital.—A. T. Fripp, H. J. Seddon.

National Heart Hospital.—Sir Russell Brock, J. Maurice Campbell.

St. Peter's and St. Paul's Hospitals.—A. W. Badenoch, J. D. Fergusson, * H. K. Vernon.

Royal Marsden Hospital.—A. Lawrence Abel, E. E. Pochin.

Queen Charlotte's and Chelsea Hospitals.—Frank Cook, A. B. Evans, * J. B. Blaikley (till March 31, 1957).

Eastman Dental Hospital.—W. E. Herbert, * G. S. Wigley.

United Newcastle upon Tyne Hospitals.—R. V. Bradlaw, R. B. Green, F. J. Nattrass, James Hendry, * E. A. Pask.

United Leeds Hospitals.—P. J. Moir, D. C. Muir, T. Talmage Read, J. E. Rusby, * J. R. H. Towers.

United Sheffield Hospitals.—C. S. O'Flynn, * F. W. Holdsworth, R. P. Jepson.

United Cambridge Hospitals.—A. L. Banks, T. J. Fairbank.

United Oxford Hospitals.—C. W. Carter, Honor Smith, A. S. Till, * Colonel L. K. Ledger (till March 31, 1957).

United Bristol Hospitals.—A. I. Darling, * A. L. Eyre-Brook.

United Cardiff Hospitals.—Lambert Rogers, James Walker, * W. W. Mushin, * Harold Scarborough.

United Birmingham Hospitals.—R. S. Aitken, Ernest Bulmer, J. M. Smellie, * J. C. Heather (till March 31, 1958).

United Manchester Hospitals.—* S. B. Smith, * G. A. G. Mitchell.

United Liverpool Hospitals.—Sir Henry Cohen, * A. McKie-Reid, * J. Howell-Hughes.

In England Now

A Running Commentary by Peripatetic Correspondents

CROSSING from Jordan to Israel is like crossing the Rubicon. It is a matter of a few yards only, but it is a decisive step. There is no going back—unless one has two passports. A great but invisible gulf carves into two the land that both sides still call Palestine.

I found the change far more deep and impressive than I had imagined. I walked from the cramped crowded streets of the old city of Jerusalem, lined by tiny shops overflowing into the path outside and presided over by their Arab owners in long gallabeya and flowing traditional head-dress, to the busy Western world that is the Israeli part of Jerusalem. After passing through a ghetto where orthodox Jews wearing broad black hats walked slowly in the sun with long greasy side-whiskers meticulously curled beside their shaggy beards, I came into a busy commercial street. Here the women were not veiled nor clad in black but all wore Western dress. The girls had trousers and tight-fitting sweaters; the men had good suits showing American influence in their cut. The shops were large, new, and well filled. British goods were scarce and expensive and the cost of living is higher than in England.

Country as well as town reflects the change. The Arab tills his unprofitable strip of land with the same kind of wooden plough that his ancestors used when Christ walked these hills. Israel, which has far more fertile land and the great plain beside the Mediterranean, uses caterpillar tractors and multi-share ploughs. Houses in Jordan are flat-roofed. New houses in Israel (within sight of their flat Arab cousins) are gabled and tiled (except for a small area around Nazareth where Christian Arabs continue to build as they have done for generations). Grass, which is plentiful in Israel, is rare in Jordan. As soon as a daring blade shows its nose above the ground hungry goats nibble it off. In all the Israel I visited I saw only one flock of goats—in Nazareth.

The difference between the conservatism and horror of change in Jordan and the progressive modernism in Israel is vitally significant to both countries. Until these two small States, so utterly and bitterly opposed, are reconciled, real peace cannot come again to the Middle East.

* * *

A year ago the first report on H.N.Y.W.P. (hydroxypropylnor-yenwupongine), the citronella-soluble extract of the Chinese muck-weed *yen•wu pong*, appeared in these columns.[1] Since then research centres have sprung up all over the world, lecture tours have been given in four continents, and in Cameria the first university chair of yenwu has been established. A world Y.W.P. congress is to take place in the Canary Isles this summer and the *Quarterly Journal of Yenwupongology* is already in its third quarter. A new qualification, for which several enterprising hospitals conduct postgraduate courses, has already been set up, and the M.R.C.P.(Y.) is expected to become an essential prerequisite for all future consultant appointments. The impact of the discovery has not been without political repercussions. Talks at the highest level have reaffirmed faith in peaceful coexistence, export restrictions of muck-weed have been lifted, and an expedition of botanists has gone to China to study local fertilisers.

In England, the newly appointed yenwupongine travelling research fellow has drawn attention to the dearth of scientific base-line data. His first task has been to launch a survey into the natural history of arteriosclerosis, and questionaries have been circulated to all general practitioners. Unfortunately, many were invalidated by improper replies, although each form was accompanied by a 120-page explanatory booklet. However, past impressions that arteriosclerosis is not incompatible with longevity would appear to be substantiated, and credit must go to the members of the two influential London clubs who have temporarily buried the gold-headed hatchet and jointly sponsored this investigation.

A new line of research is already bearing fruit at the Guysex Free Hospital where intensive work is being done on the arteriosclerosis of the crocodile. Since the ophthalmoscopic appearances of exudates, hæmorrhages,

1. *Lancet*, 1955, i, 917.

and arteriovenous nipping are not dissimilar from those found in man, the crocodile would seem to be an ideal experimental animal, though minor technicalities remain to be overcome.

Meanwhile, at Barthomary's Hospital, clinical studies continue. Two active principles have now been isolated, yenwupongine and yenwupongeine, both of which, when suspended in vitriol and administered by surreptitious injection, produce perivascular cellular infiltration, necrosis, and refusal to submit to further treatment. This phenomenon, known as Ducane's triple response, is thought to originate at some place in the craniotarsal axis, though some would dispute this hypothesis. Other toxic side-effects may include leucocytosis, leucopenia, frequency, oliguria, depression, euphoria, wasting, obesity, diarrhœa, and constipation. Clearly, the theoretical justification for the exhibition of yenwupongine and yenwupongeine has not yet been fully elucidated, nor are these measures free from hazard. But the physician has acquired a remarkable chemical tool which, if used judiciously, may lead to a better understanding of a common disease of today.

* * *

Parents and psychiatrists may be concerned because cowboys and Indians have lost their appeal. Robin Hood is a back number; and all the current heroes are intrepid explorers of outer space and distant planets. But for one anæsthetist it is a blessing. The six-year-old spaceman never objects to the bathing-cap which is affixed preoperatively. It is so like a space-helmet that it might have come straight from Dan Dare himself. The anæsthetic face-piece holds no terrors for the modern nipper, for all the best space-men apparently breathe oxygen from a similar device. Induction is carried out smoothly with appropriate asides—"Air-lock closed," "No. two motor ready"—so that the roaring in the ears which heralds impending unconsciousness follows quite naturally. The rocket motors are on. (Somehow they never did seem to swallow that yarn about the workmen outside in the street.)

This simple deception can be easily enhanced by the glittering paraphernalia on the average Boyle's machine. A laryngoscope makes a very fair space-gun, an ethyl-chloride spray a convincing death-ray. And Magill's forceps are just the job for removing meteorites from Martians' hooves.

* * *

Lit-tle Gee-Pee is very hap-py be-cause his poorly pat-ients are all get-ting bet-ter on Sachets of Servo-assisted Senna, the new Wonder Drug. "Ha-ha!" he laughs!

Lit-tle Gee-Pee reads all about Sachets of Servo-assisted Senna in the Fairy Tale Picture Books which the kind Uncles at the manu-fact-urers' of-fices send him ever-y morn-ing.

But here comes Teacher! She is cross with Gee-Pee for' pre-scribing Servo-assisted Senna in-stead of Bis-2 : 4 : 6 : 8 : diethyleeni-meeni-amino-p'-benzaldehidehodehyde of senna (90% u. p.) *N. F.* (Wasn't that a long word, Teeny-tinies? Be sure you get it right, or Jolly Uncle Jack at the Pric-ing Bur-eau will have to make you write out your pre-scrip-tions all over again!)

"You are a *naughty* boy, Gee-Pee!" scolds Teacher.

"Instead of play-ing golf this after-noon with the other lit-tle girls and boys, you will stay in after Surg-ery and write out fif-ty times, in your best hand-writing, 'The Standing Joint Committee on the Classification of Proprietary Preparations and the Joint Committee on Prescribing Know Best.'"

"Boo-hoo!" cries poor Gee-Pee. "I will tell my Psy-chiatrist about you!" But his lit-tle friends Sam-my Statist-tician and Rupert the Rep. do lots of hard sums, and—what do you think! They find that Sachets of Servo-assisted Senna cost ever so many less pennies than Bis- 2 : 4 : 6 : 8 : diethyletcetc. of senna (90% u. p.) *N. F.*!

Off they scam-per to tell Teacher, and now they are *all* staying in after Sur-gery *ever-y day this week* to write out one hun-dred times, in BLOCK CAPITALS, "I must not teach my Grand-mother to suck expensive medicaments." And there will be lots of pen-nies de-duct-ed from their quarter-ly cheques!

(An-other teeny-tiny tale soon.)

Letters to the Editor

SMOKING

SIR,—The Minister of Health's cautious pronouncement on the association of smoking with cancer and the tobacco firms' pontifical edict belittling the important evidence to date [1] are disappointing but understandable; for the health service, for which the Minister is responsible, derives a substantial part of its financial nourishment from taxation on tobacco, while the tobacco companies have naturally to consider their employees and shareholders. In the face of such powerful vested interests it is not easy for our profession to convince the public of the dangers of smoking: it is even more difficult for those of us who are already enslaved by the habit.

The recent increase in tobacco duty suggests that the Government already have a guilty conscience; but why did they not give a moral lead by increasing the tax on cigarettes only, for these represent the principal threat to health? They should have announced their intention of introducing legislation to prohibit the sale of tobacco to persons under 18 and so educate the public to adopt, as with alcohol, a responsible attitude towards its enjoyment. At least they could have determined to warn National Servicemen, for whom they have a special responsibility, of the insidious and costly nature of the cigarette habit.

The tobacco companies' "smoke screen," to which you referred in your annotation last week, is cleverly worded: they speak of "a *possible* relationship" between lung cancer and smoking when the profession has accepted the association for some time, and "a *suggestion* that smoking *may* be a *contributory* cause" (italics all mine). They note that only a small proportion of smokers contract this disease, which occurs also in non-smokers. What are they waiting for? Until every smoker contracts cancer and until all atmospheric pollution has been banished? Not everyone falls victim to smallpox or poliomyelitis in an epidemic, but this fact does not deter the State and the profession from doing their best to save as many lives as possible. But even more pernicious is the firms' claim that smoking is a boon to millions and that its benefits, both physiological and psychological and as yet ill defined, might well be the subject of scientific research. Such subtle propaganda as they have put forth, directing the public's attention away from the lethal facts, is calculated to stimulate the hardened but recently scared habitué to once more reach out for a packet of his favourite blend of the drug and to incite others, including susceptible teenagers, to investigate for themselves these alleged benefits. It would be salutary for the boards of certain tobacco companies who actively encourage the growth of the cigarette habit to see the final stage of the grim tragedy, as do we, all too often, on the necropsy slab. Their generosity in providing money for research was unquestionably activated by humanitarian interest, but at the same time it inspired the public's trust in their policy and judgment; they have therefore assumed a grave moral responsibility.

As a profession it is our clear duty to be outspoken and broadcast the important truths which have already been established. We can vehemently discourage smoking in adolescence and warn against its habit-forming tendencies. We can begin now to speak of "tobacco bronchitis," "smoker's cancer of the lung," "smoker's cancer in the liver (or in the brain)," so that the public will the more quickly learn to associate cause with effect. Finally, we who enjoy a smoke can ourselves set an example by keeping the habit under control.

London. W. H. MCMENEMEY.

1. *Times*, May 8, 1956.

G.M.C. ELECTION

SIR,—Because we think that younger men should take part in the leadership of the medical profession, my wife and I voted only for Dr. Whiteside and Dr. Dillon. If others of like mind were to vote only for the younger, unsponsored, candidates and refrained from entering any votes for the official candidates, this might counter the heavy pressure of B.M.A. canvassing and give the younger man a fairer chance.

Port Talbot, Glamorganshire. R. A. ROBERTS.

SIR,—I am in entire agreement with Dr. Whiteside and Dr. Dillon. It is wrong that our money in the B.M.A. should be used to canvass votes for men standing for the G.M.C. I admire the pluck of these two who dared to stand against the "old brigade." May I wish them better luck next time on behalf of the 16,000 who voted for them.

Wimborne Minster, Dorset. E. H. MARKBY.

BASAL HORIZONTAL LINES ON CHEST RADIOGRAPHS

SIR,—In mitral stenosis attention has been paid to the lungs as well as to the heart, and the horizontal lines seen in radiographs in the lower lung fields have attracted particular attention. Dr. Rossall and Mr. Gunning (May 5) show that these lines are of clinical significance, indicating a disturbance of the pulmonary circulation of such a degree as to warrant valvotomy. These lines, therefore, are sufficiently important that their anatomical counterpart should be clearly understood, and I write to correct a misunderstanding by Rossall and Gunning.

They refer to papers of mine [1] and others [2] and speak of "accumulation of tissue-fluid in *interalveolar septa*" as the cause of the lines, but this is a misquotation. I have shown, by comparison of radiographs and lung sections, that pathological changes in the *interlobular septa* are responsible for the lines. Œdematous alveolar walls would be of such microscopic size that they would not show up as lines recognisable in radiographs. The anatomy underlying the lines is that of the septa between lung lobules (which are also called "secondary lobules" by Miller [3]) and which are the smallest units of the lung separated from their fellows by fibrous septa. These lobules are of various sizes but, on average, about 1 cm. in diameter. Kerley [4] thought that the interlobular septa were too short to account for the lines, but, in large sections prepared by the Gough and Wentworth technique, the septa can be readily traced from one lobule to the next deep into the lungs. When the interlobular septa are sufficiently parallel to the X-ray beam, and at the same time pathologically thickened, or laden with hæmosiderin or radio-opaque dust, they will show up as lines. In the septa is one of the systems of lung lymphatics, and Kerley is right in saying that these lymphatics are distended but the main bulk of excess fluid is in the connective tissue of the interlobular septa, which become widened.

I agree with Rossall and Gunning that the rise of the left auricular and pulmonary venous pressure rather than the rise of the pulmonary arterial pressure is the cause of this interlobular septal œdema, and I think the following is the mechanical explanation. In the interlobular septa are the pulmonary veins, and I have found these distended at the inner ends of œdematous interlobular septa. The distended veins may have obstructed the lymphatic flow, and fluid which normally runs centrally is diverted towards the pleura. This latter route is a normal one for the superficial part of the lung, but it may have to carry a larger volume of fluid when the pulmonary veins are overdistended. When the volume is too great, the lymphatics become distended and the surrounding interlobular septal tissues become œdematous. Such an explanation would account for œdema of the interlobular septa in the absence of œdema of the air-spaces. Bruwer et al.[5] have also suggested, on theoretical grounds, that distension of pulmonary veins may cause lymphatic obstruction.

Welsh National School of Medicine, Cardiff. J. GOUGH.

SIR,—The excellent paper by Dr. Rossall and Mr. Gunning provides yet further evidence to support the thesis previously presented [6] as to their pathological significance.

Rossall and Gunning deal only with the production of this radiographic sign in cardiac disease (and particularly in mitral disease), and show that its presence is related to a dangerously high left-auricular pressure. In cardiac disease the lines indicate a state of pulmonary capillary, venous, and left-auricular hypertension usually secondary to mitral disease or left-heart failure, and they provide a warning of impending alveolar œdema. These lines, however, occur in many other states in the absence of cardiac disease or of pulmonary hypertension.

There can be no doubt that they are caused by œdema (and later organised thickening) of the peripheral interlobular pulmonary septa.[1 2 6 7] Œdema of these septa is produced by exactly comparable mechanisms to œdema elsewhere in the body—e.g., the soft tissues of the legs.

(*a*) Œdema may be produced by an increased capillary hydrostatic pressure. This pulmonary capillary hypertension is usually secondary to the increased pulmonary venous and left-auricular pressures due to mitral stenosis. In mitral disease, therefore, the occurrence of this radiological sign indicates pulmonary capillary hypertension and provides a valuable indication for intensive treatment including valvotomy.[6] In pulmonary arterial hypertension secondary to congenital systemic-pulmonary vascular shunts, the capillaries are usually protected from the hypertension by the rapid fall of blood-pressure in the narrowed pulmonary arterioles. As Rossall and Gunning show, it is well known that in these cases of pulmonary hypertension secondary to congenital heart-disease, the pulmonary capillary and left-auricular pressure rarely exceeds the plasma colloid osmotic pressure of 25 mm. Hg, and therefore pulmonary interstitial œdema and its corresponding radiographic sign do not occur. In left-heart failure, however caused, the lines may be seen when the pulmonary venous and capillary pressure is sufficiently raised.[6 8]

(*b*) Œdema may be caused by lymphatic blockage, as in mediastinal reticuloses, sarcoidosis, pneumoconiosis, lymphangitis carcinomatosa and possibly bronchiectasis. When the impairment of lymph drainage is sufficient to cause œdema of the pulmonary interstitial tissues, the identical horizontal lines are seen on the radiographs.

(*c*) Œdema may be caused by increased permeability of the capillary membranes. This change occurs in pulmonary [9] as well as in systemic capillaries and explains the occasional occurrence of these lines in chest radiographs in acute nephritis (even in the absence of left-heart failure), allergic lung conditions, and exposure to toxic gases.

(*d*) Œdema may be caused by reduced plasma colloid osmotic pressure, as in hypoproteinæmia, and although I personally have not seen these transverse lines in this condition they should theoretically occur.

In (*d*) and particularly in (*c*) the illness may be acute, and it is likely that the interstitial pulmonary œdema may be obscured by the accompanying alveolar œdema.

1. Gough, J. *Lancet*, 1955, i, 161.
2. Fleischner, F. G., Reiner, L. *New Engl. J. Med.* 1954, **250**, 900.
3. Miller, W. S. The Lung. Springfield, Ill., 1947.
4. Kerley, P. *In* Textbook of X-ray Diagnosis by S. C. Shanks and P. Kerley. London, 1951; vol. 2.
5. Bruwer, A. J., Ellis, F. H., Kirklin, J. W. *Circulation*, 1955, **12**, 807.
6. Grainger, R. G., Hearn, J. B. *J. Fac. Radiol. Lond.* 1955, **7**, 66.
7. Short, D. S. *Brit. Heart J.* 1955, **17**, 33.
8. Short, D. S. *Ibid*, 1956, **18**, 235.
9. Cameron, G. R. *Brit. med. J.* 1948, ii, 965.

In (*a*) and (*b*), which are likely to be of long standing, particularly in mitral disease, thickening of the alveolar basement membrane prevents the easy access of interstitial fluid into the alveoli.[10]

It is fundamentally important to interpret radiographic signs logically (hence radi-ology) in terms of anatomical site, disordered physiology, and pathological processes. This valuable radiographic sign, appreciated years ago by Kerley,[11] should be regarded as indicating œdema of the peripheral interlobular pulmonary septa and *not* necessarily as indicating pulmonary hypertension. The anatomical site is the interlobular septa; the disordered physiology is œdema; and the pathogenesis is either pulmonary capillary hypertension, lymphatic obstruction, or, less commonly, increased permeability of capillary membrane or hypoprotinæmia, depending on the particular clinical associations.

Now that the basic mechanisms responsible for these lines are better appreciated, we are no longer justified in naming them in purely visual (and verbose) terms (e.g., "basal horizontal lines on chest radiographs") or by eponymous reference. This valuable radiological sign should be given an anatomical designation (e.g., "peripheral or [basal] interlobular septal lines") or should be described in pathological terms (e.g., "lines of interstitial pulmonary œdema"). When described in such terms, their significance will become more widely appreciated: they represent the only objective evidence of waterlogging of the pulmonary interstitial tissue and its lymphatics.

St. Thomas's Hospital, London, S.E.1. RONALD G. GRAINGER.

SIR,—We were most interested to read the paper by Dr. Rossall and Mr. Gunning. The findings agree substantially with our own.[12] As we stated, "when lines B were absent the pulmonary capillary pressures were usually well below 30 mm. Hg. When present the pressures were almost invariably above 30 mm. Hg." We agree with Rossall and Gunning on ætiology also: "It appears likely that when the pulmonary capillary pressure approaches plasma osmotic pressure, there is exudation of fluid with deficient reabsorption."

We, too, found at first some difficulty in seeing basal lines in patients with heavy breast shadows, but this was overcome by taking an additional postero-anterior chest film of the bases with the mammary tissue well elevated by the patient's own hands. The film, however, is likely to be too dark for diagnostic purposes unless some reduction is made in exposure—usually of the order of 3 kV.

Our present studies suggest that, although the raised pulmonary capillary pressure plays a major part in the production of basal horizontal lines in mitral-valve disease, in the other conditions in which the lines occur there are other factors of greater importance.

J. H. E. CARMICHAEL
Liverpool. D. G. JULIAN.

TREATMENT OF BURNS AND SCALDS

SIR,—Last November, my wife, who is 80, scalded her foot very badly, although it was the result of upsetting only half a pint of boiling water. Her doctor said that no ointment or oil should be applied, and the foot must be exposed to the air, even to the extent of keeping it out of bed for two nights, in none-too-warm weather.

For weeks my wife was confined to bed, with severe pain for which no soothing substance was applied. Later on penicillin injections were given. It is only within the past two or three weeks that she has been able to get about, while the foot has been, and still is, very painful. There is a large scab of wrinkled flesh right across the toes, from the stretching of which, during walking, blood has appeared in two places.

Can this be considered a successful example of the modern method for dealing with burns and scalds? In contrast, I would instance the case of a local baker who badly burned his arms. He was treated in the old-fashioned way, by applying ointment and covering up the arms. Within a fortnight he was back at work.

UNCONVINCED.

CYSTIC PNEUMATOSIS

SIR,—Cystic pneumatosis, although comparatively uncommon, cannot be so rare as is imagined. Since 1951 two cases have occurred in this hospital. Both were detected during routine barium meals and were subsequently proved at operation.

Most workers agree that this condition occurs in association with intestinal obstruction.

Nitch [1] described 85 cases and stated that 50% of the cases were associated with gastric or duodenal ulcer and in 83% of these pyloric stenosis was present.

Mathews [2] reported a case of enteric pneumatosis in which the pelvic colon was mainly affected, the cysts being submucous and subserous.

Griffiths and Ellison Nash [3] report a case of gastric ulcer with associated ileal pneumatosis, the affected loop being under the diaphragm and in a suprahepatic position and leading to a diagnosis of peptic perforation.

The commonest complications are pneumoperitoneum and intestinal obstruction, including intussusception. Nitch is of the opinion that the cysts and the affected portion of the intestine are best left alone unless causing obstruction by pressure, adhesions, or projection into the lumen of the bowel. The cysts disappear in the majority of cases after the cure of the coexisting lesion.

Jones [4] described a case in which a chronic volvulus of the sigmoid colon was associated with cystic pneumatosis of the large gut. However, I am unable to find a reported case in which chronic volvulus of the jejunum was the obstructing lesion.

CASE 1.—A man, age 49, was admitted to this hospital on Dec. 6, 1951, with a two-year history of intermittent dragging pain on the left side of the abdomen, associated with attacks of diarrhœa and constipation. Subsequent barium enema revealed no abnormality, but straight radiography of the abdomen showed mild pneumoperitoneum and several fluid levels in moderately distended loops of small intestine in the left upper quadrant. Barium meal and follow-through showed partial obstruction of the upper small gut but no abnormality in the stomach and duodenum.

Laparotomy on Dec. 23, 1951, revealed volvulus of the upper jejunum. The mesenteric border of the affected jejunum contained multiple large diverticulæ ranging in diameter from $^1/_2$ to 2 in. The terminal ileum was affected by cystic pneumatosis, the cysts being subserous and situated both on the mesenteric and the antemesenteric borders. All were small (about $^3/_8$ to $^3/_{16}$ in. in diameter) and sessile. The volvulus was reduced and the affected jejunum resected, continuity being restored by end-to-end anastomosis.

Convalescence was marred by a burst abdomen, but the patient was finally discharged as an inpatient on Feb. 5, 1952.

CASE 2.—A woman, age 60, was admitted to this hospital on April 6, 1954, with a two-year history of vomiting and indigestion indicative of pyloric stenosis. The patient was thin and had a vague, tender, small epigastric mass. Radiographic examination on April 14, 1954, showed free gas under both halves of the diaphragm and evidence of a small pyloric ulcer with severe spasm.

Laparotomy was undertaken on April 20, 1954, when a firm hypertrophied pylorus was found in association with cystic pneumatosis of the terminal ileum, involving two isolated lengths 6 in. and 9 in. long. The cysts, which were about

10. Parker, F., Weiss, S. *Amer. J. Path.* 1936, **12**, 573.
11. Kerley, P. J. *Brit. med. J.* 1933, ii, 594.
12. Carmichael, J. H. E., Julian, D. G., Penrhyn Jones, G., Wren, E. M. *Brit. J. Radiol.* 1954, **27**, 393.

1. Nitch, C. A. R. *Brit. J. Surg.* 1923, **11**, 714.
2. Mathews, F. J. C. *Brit. med. J.* 1954, i, 851.
3. Griffiths, J. D., Nash, D. F. E. *Ibid*, 1955, ii, 1602.
4. Jones, J. D. T. *Brit. J. Surg.* 1948, **36**, 49.

1/8 in. in diameter, were situated both on the mesenteric and on the antemesenteric borders of the affected gut beneath the peritoneum. Partial gastrectomy was undertaken, and the postoperative convalescence was uneventful. Pathological examination revealed pyloric hypertrophy with a small pyloric ulcer.

Hackney Hospital, London, E.9. R. F. READ.

GIANT HYPERTROPHIC GASTRITIS

SIR,—Giant hypertrophic gastritis is so rare that few have the opportunity to treat many cases. As stated by Dr. Williams (April 7), gastrectomy is usually considered necessary when this condition gives rise to severe blood-loss. I have devised a less mutilating operation, and report here two cases in which it was undertaken.

CASE 1.—A woman, aged 67, gave a history of many years' indigestion, worse for the past twelve months. Her appetite had for this time been extremely poor, and she had lost a little weight. On examination she was a frail old lady. There was tenderness and a rather doubtful mass in the epigastrium. Barium meal showed a filling defect in the mid-zone, thought to be a carcinoma.

Laparotomy was performed on Dec. 11, 1952. The stomach, though it felt curiously thickened, was clearly not the site of a typical carcinoma. The anterior wall was incised and immediately the gastric mucosa protruded, at first resembling a papilloma. However, it was soon clear that it was a case of giant hypertrophic gastritis. The mucosa could be lifted out of the opening without dimpling the muscle and serosal layers. I was then faced with the question whether to perform a total gastrectomy. The ease with which the mucosa could be lifted out of the stomach suggested that it might be possible to remove some of the redundant mucosa only. To my delight, after incising the mucosa I was able to separate about 3 square inches from the muscularis. Bleeding was slight and easily controlled without clamps. Suture of the mucosa restored the continuity of the lining. Recovery was uneventful and she remained well until the middle of 1955. She has at present symptoms similar to those of a gastric ulcer, but X-ray examination shows only the enlarged mucosal folds. Her appetite is not very good but she remains reasonably well on the medical régime used in peptic-ulcer cases. Re-examination of the preoperative radiographs shows appearances typical of giant mucosal folds.

CASE 2.—A man, aged 30, had had severe, almost continuous epigastric pain for about twelve days, slightly better for the last two days. He had vomited several times. He had a past history of indigestion, with pain about an hour after food. This had been investigated elsewhere, without a definite diagnosis being made. On examination he was a sallow, anxious man. There was no mass but some tenderness in the epigastrium. Barium meal showed a filling defect on the greater curve, but it was not typical of a carcinoma. Gastroscopy showed no tumour but large folds; it was not realised, however, how large they were.

Laparotomy was undertaken on March 3, 1953. The stomach was palpably thickened and felt somewhat like a bag of worms. It was incised, and again the mucosa protruded like a papilloma. I decided to follow the same course as in the previous case, and I removed 4–5 square inches of mucosa. Bleeding was not severe and suture restored the lining satisfactorily. He was followed up for over eighteen months and remained quite well, although for some months he occasionally had indigestion. He had had a great fear of cancer which had to be overcome. Barium meal in May, 1953, showed hypertrophic folds but considerably less pronounced than before operation.

On reflection I am sure I should have removed more mucosa in the first case. I also think it would be quite easy to remove more mucosa than in case 2. This could perhaps be better done through two incisions. Diagnosis should be easy before operation, as the radiographic appearances are so typical, but operation may still be undertaken to rule out a carcinoma. Fortunately, if the diagnosis has not been made it will become obvious on laparotomy, especially if the stomach is opened. Should the operation of mucosal resection fail, it could be repeated, or a total gastrectomy performed.

Shenfield, Essex. W. D. PARK.

RESIN-REINFORCED PLASTER CASTS

SIR,—I feel obliged to attempt to dampen the enthusiasm expressed by Mr. Morrison (April 21) for the resin-reinforced bandages ('Gypsona-Extra').

Through the kindness of Messrs. Smith & Nephew I had an opportunity to try these bandages when they were in the experimental stage, and my first reaction was one of enthusiasm. Since the gypsona-extra have come on the market for ordinary use I have used them exclusively in the sizes in which they are available. My enthusiasm has by now considerably diminished.

I agree that there is very little wasting of the plaster content. I am not so convinced of the other advantages claimed for these plasters. I have been particularly impressed by the fact that they take a long time to become quite rigid, compared with the ordinary gypsona bandages, in spite of the catalyst.

I did not form this impression when I was using the experimental bandages on clinical trial, but I have observed this slowness particularly in the gypsona-extra bandages now on the market. This difficulty is overcome to some extent by squeezing the water out of the bandage very strongly, but it is not eliminated by this. Between the moment of initial drying of the plaster and the development of complete rigidity there is a rather long phase in which the plaster appears hard but can be easily indented with moderate pressure of the hand. Unless one is aware of the long duration of this phase there is a danger that the shape of the plaster may become distorted from the pressure of the surface on which it rests if it is not protected by suitable padding. This long phase of plasticity has a further disadvantage if one is applying a plaster which has to be moulded on a limb. It makes it difficult to mould the plaster accurately around bony points. When it is moulded in at one place it tends to bulge out nearby like a rubber ball partly distended with air.

Because of the slow drying of these plasters I have found it necessary to use for a cast a quantity of plaster not very much less than that used with ordinary gypsona. The only alternative to this is to keep the patient a long time in the plaster room, because if the patient is transported back to the ward while the plaster is still in the "plastic" stage there is a strong likelihood that the plaster will be spoilt.

Though it is not a point of great importance, the finish of these plasters does not compare with the finish of the ordinary gypsona plaster.

I would like once again to make a plea for the more universal use of the casts made out of a combination of 'Glassona' and ordinary gypsona. By using a light base of gypsona on which the glassona can subsequently set slowly it is possible to make a very light cast for any region. These casts are possessed of excellent rigidity so that, for instance, a spinal jacket can be split on one side and slipped off and put on again without losing its shape, and the forearm cast applied, say, for tenosynovitis can be split on one side and slipped off and reapplied and used in much the same way as a block leather support.

I think it would be a great pity if either gypsona or glassona were taken off the market and replaced by the new gypsona-extra bandages.

County Hospital, Lincoln. DAVID F. THOMAS.

ADDICTION TO METHYLATED SPIRIT

SIR,—Many features described by Dr. MacDougall and Mr. MacAulay (April 21) were also present in methylated-spirit drinkers among alcoholics admitted to Warlingham Park Hospital in recent years—for instance, "emotional blunting, a tendency to vagrancy, pessimism, and depression." As Dr. MacDougall says, quite a few methylated-spirit drinkers can be rehabilitated. The proportion of methylated-spirit drinkers was somewhat higher among our alcoholic patients (varying over the years from 10 to 20%) and there were several women among them, including one with optic atrophy. The average age at which these people began to take methylated-spirit was 35·6 years (i.e., in the "chronic phase" of alcohol addiction), after having consumed excessive

amounts of ordinary alcoholic drinks for about ten years. They then turned to methylated spirit for economic reasons and at a time of "heightened loss of morale."[1] However, as Dr. MacDougall remarks, methylated-spirit drinking is by no means the last stage of alcoholic excess. On the average a further five years of excessive drinking followed before these addicts reached what they themselves regarded as their "lowest point."

Compared with the majority of our alcoholic patients, the methylated-spirit drinkers were slightly lower in occupational status, intelligence, and rates of recovery and improvement. Thus most of them belonged to social class III and were of average or just above average intelligence (compared with a large proportion in social classes I and II and of superior intelligence among our alcoholics in general). Methylated-spirit drinkers were also found among small recent samples of homeless excessive drinkers (3 out of 40)[2] and of alcoholics admitted to a London observation ward (4 out of 56).

Drinking of methylated spirit was held responsible for the condition of the offender in approximately 0·9–1·8% of "proved offences of drunkenness" in England and Wales over the past fifteen years.[3]

Warlingham, Surrey. M. M. GLATT.

ARTIFICIAL RESPIRATION

SIR,—I am writing on behalf of the chief medical officers of the area gas boards.

Artificial respiration should be carried out immediately and uninterruptedly on people who have been partly asphyxiated by drowning, gassing, or electrical shock. It is well recognised that a delay of even a few seconds may be fatal. Nevertheless it appears to be common practice to move patients undergoing artificial respiration into an ambulance and to attempt to carry out artificial respiration on the way to hospital.

It is highly improbable that satisfactory artificial respiration can be carried out in a moving ambulance, and it therefore follows that a patient who needs artificial respiration should have it on the spot. This must be well known to all doctors who have considered the matter, but the fact that such patients are still put into ambulances indicates that the ambulance attendants are not aware of the correct practice. We therefore suggest that all doctors who have to do with the instruction of ambulance attendants should emphasise and re-emphasise this point.

South Eastern Gas Board,
Medical Department,
589, Old Kent Road, London, S.E.15. R. E. W. FISHER
Chief medical officer.

CLOSED TRAUMATIC LESIONS OF THE AXILLARY AND BRACHIAL ARTERIES

SIR,—I read with interest the successful results of sympathectomy for occlusion of the axillary artery described by Professor Rob and Mr. Standeven (May 5). The following case responded to intravenous procaine.

A woman, aged 67, was referred by Dr. Curtis Bain, with thrombosis of the right axillary artery of seven weeks' duration. The right hand and forearm were cold and pale, the pallor increasing on raising the arm and on immersion in hot water. Movements were weak and inhibited by pain. No pulsation was palpable in the right brachial, radial, and ulnar arteries. A feeble pulse was felt at the apex of the axilla. The pulses of the left arm and both legs were normal.

Intravenous infusions of 1 g. of procaine hydrochloride in one pint of physiological saline solution were given at a slow rate daily for four days in the outpatient department. Thereafter, procainamide 0·75 g. daily in three doses was taken by mouth for one week. Improvement began at once and after the third infusion was maintained. Four to five hours after the third infusion the patient felt a wave of warmth steal down her arm, and she saw the veins of her hand fill up. Pain on movement was reduced to a dull ache. On the sixth day the stellate ganglion was blocked. The hand warmed still further within five minutes—an effect similar to that at the end of an infusion of procaine hydrochloride. This effect lasted four to five hours. Eight days after the beginning of treatment she spent all the morning sewing with her right hand and complained of only a slight ache. The right hand was now only slightly paler and colder than the left. It became red and comfortable on immersion in hot water. Sympathectomy now seemed unnecessary. Six months later the brachial and radial pulses had returned.

The vasodilating properties of procaine hydrochloride are cumulative and independent of the speed of infusion. Unpleasant side-effects can be prevented by slow administration. The procainamide may or may not have been beneficial.

General Hospital, Harrogate. JANE PEARCE.

PERFORATED ACUTE AND CHRONIC PEPTIC ULCER

SIR,—We owe a considerable debt to Mr. Hermon Taylor for proving, beyond all doubt, that a diagnosis of perforated peptic ulcer does not necessarily demand immediate operation.

However, I am a little confused by the recent report by Mr. Taylor and Mr. Warren of their treatment of 200 cases of perforation (April 14). Part of the confusion may be due to their published data having been limited by considerations of space.

1. What proof is there that all these 200 cases had a perforated ulcer? The authors do not pretend that clinical diagnosis is very reliable, and indeed they admit to 17 proven errors in 108 cases. Is it possible that there were other, unrecognised, mistakes? May we know how many unoperated cases showed no radiological evidence of gas in the peritoneal cavity?

2. They remark: "it seems clear that partial gastrectomy is the treatment of choice" for perforated chronic ulcers which do not respond to conservative treatment. With the utmost respect, it is not clear to me. How many emergency gastrectomies were, in fact, performed; and was the number large enough to justify such a dogmatic opinion, from so authoritative a source, on a matter of such far-reaching importance?

Why is it better to stop the leak by an operation lasting an hour and a half on a patient in rather a delicate state of health, when it can be stopped quite easily by an operation lasting fifteen minutes? It beats me.

South Mimms, Herts. V. J. DOWNIE.

MEPACRINE FOR PETIT MAL

SIR,—Arellano and Alejandro[1] described long-continued benefit in cases of petit-mal epilepsy from mepacrine in a dosage, for patients over 7 years of age, of 100 mg. every six hours to a total of 1·3–3·3 g. In the two following cases I gave 100 mg. six-hourly for four days to a total of 1·6 g.

CASE 1.—An imbecile boy, aged 7 years, had had severe petit mal despite many different drugs. The best regimen was phenobarbitone gr. 1/8 thrice daily and dexamphetamine 5 mg. twice daily, but even with this the average number of petit-mal attacks observed was 300 a month. To his normal routine was added a course of mepacrine. Fits immediately ceased for two weeks; they then returned in their former intensity but slowly decreased over the next month to a level of 2–3 a day, and this level has been maintained for the past three months. This boy has improved as a whole and can now take a greater part in the games of his friends and walk to the occupation centre (about 200 yards) without falling. Before treatment with mepacrine he had had to be taken in a chair

1. Expert Committee on Mental Health: Alcoholism Subcommittee. Second Report. *Tech. Rep. Wld Hlth Org.* 1952, **48**, 37.
2. Glatt, M. M., Whiteley, J. S. *Mschr. Psychiat. Neurol.* (in the press).
3. Offences of Drunkenness, 1953. H.M. Stationery Office, 1954; p. 3.

1. Arellano, A., Alejandro, P. *Int. neurol. Congr.* 1954, p. 258.

as he fell many times on this short journey. There has been no change in his electro-encephalograph, which shows a typical spike-and-wave pattern.

CASE 2.—An imbecile girl, aged 12 years, had had very frequent petit-mal attacks since admission. The attacks were not so severe as in case 1 and it was impossible to record their frequency accurately. Her walking was very unsteady although she did not often fall. No drugs had proved very beneficial, and the best regimen seemed to be primidone 0·25 g. thrice daily and dexamphetamine 2·5 mg. twice daily. To this was added mepacrine, and since then the frequency of her attacks has been reduced and she walks much more steadily.

Arellano and Alejandro stated that a period of excitation occurred a few days after the course of mepacrine, but neither of these patients showed this. I hope that others will try this apparently safe therapy.

Botleys Park Hospital, Chertsey, Surrey. GORDON DUTTON.

RADCLIFFE RESPIRATION PUMPS

SIR,—We are much interested in the description of the Radcliffe respiration pumps by Dr. Ritchie Russell and his colleagues in your issue of April 28.

They state that the use of a free-dropping weight is the best method known to them of producing a positive-pressure wave, because it removes the need for a safety-valve and gives a "square" (and therefore maximally shortened) pressure-wave. Avoidance of the need to fit a pressure-limiting device does not, in our view, make much difference, since a weight-operated safety-valve, for example, is simple and reliable. The square form of positive-pressure wave is not limited to weight-operated pumps but can be obtained with lever-operation and a cam-operated valve timed to allow a build-up of pressure before opening.

There are obvious limits to what can be done by shortening the positive-pressure wave to keep mean intrathoracic pressure at a low level, and Maloney et al.[1] found that respirators of the intermittent positive-pressure type did not compare favourably in their circulatory effects with those having a negative-pressure phase. We can see, however, that a square curve with an abrupt flow of tidal air is useful in ensuring early opening of a pressure-operated valve such as the Stott or the Smith-Clarke,[2] although this advantage disappears if a mechanical valve is used.

It may turn out that negative pressure in expiration is of crucial value only in an occasional case and that its effect does not bulk large in a series, especially as the Oxford workers have had good results without it. We are interested to see that the latest modification of the Radcliffe pump recognises a potential value in negative pressure by following the Smith-Clarke positive-negative respirator [3] in providing for its employment as well as by fitting a cam-operated mechanical inspiratory/expiratory valve—which we believe appreciably increases the safety of intratracheal pressure respiration.

J. F. GALPINE
Whitley Hospital, Coventry. COLM BRADY.

REVISION OF THE CURRICULUM

SIR,—In answer to Dr. Walker (April 28) it may not be generally known that a tutorial system similar to that envisaged by him is in existence in the clinical school at Oxford.

An individual attachment to a tutor has long been an integral and valued part of the preclinical course here. When the clinical school was opened it was decided to extend this system of personal tuition into the years the student spends in hospital. The practice is to attach each student to a member of the staff: the period of attachment varies, but during the course of his training he receives individual tuition in turn from a physician, a surgeon, and an obstetrician. The form which this tuition takes is left to the tutor concerned. It may be discussion of current research, essays on selected subjects, or more systematic instruction in a field of medicine in which the student is known to be weak.

We believe that these tutorials form a valuable part of the curriculum in that they are one of the surest ways of stimulating discussion between pupil and teacher, and of fostering the student's interest in the advancement of medicine.

JOHN BADENOCH
University of Oxford. Director of Clinical Studies.

HOME CONFINEMENT

SIR,—I feel that I must reply to some of the things that Professor Russell says in his paper last week. He quotes me as saying that the home is the right place for a confinement. What I have consistently said is, that producing a family is the essence of making a home, and it is reasonable to expect a normal and physiological process to occur there, provided that the home is fit for a confinement to take place there and, of course, that the case is a normal one.

My real point in writing this letter is, however, to agree with Professor Russell that it is high time for the maternity services to be rationalised and coördinated—our difficulty may be in agreeing how the coördination should occur. From my experience we may find that some at least of the difficulties lie at the door of the teaching hospitals. Allowing for their special position, it is not unreasonable to expect them to take their quota of social cases, and to become real partners in a coördinated midwifery scheme; we must not forget that the general practitioner has an important part to play.

I think, however, that it is an excellent thing that we should have an exchange of ideas, and a desire to improve upon a standard of midwifery that has probably never been better. While welcoming the setting up of the committee to consider the midwifery service, it is perhaps unfortunate that there appears to be little representation from the local-authority side, which has been responsible in the past for the over-all supervision of the midwifery in its area.

Public Health Department, Sheffield. LLYWELYN ROBERTS.

ADMINISTRATION OF IRON IN ANTENATAL CLINICS

SIR,—Dr. Edgar and Dr. Rice state (May 5) that they were compelled to use tabellæ ferri sulphatis as there was no suitable alternative and at the time of planning the trial ferrous gluconate was not available. This would appear to date their work back by some four or five years.

A more recent development in oral iron therapy has been provided by ferrous succinate ('Ferromyn'), which I have shown [1] to evoke a satisfactory clinical response in the treatment of iron-deficiency anæmia due to pregnancy. With administration of one tablet three times a day 105 mg. of bivalent iron is made available for hæmopoiesis, and this small dose rarely causes any intolerance. 52 patients with severe hypochromic anæmia due to excessive demands for iron in pregnancy were given this daily dose and all responded, the average mean daily hæmoglobin rise being 1% (0·148 g. per 100 ml.).

These results compare favourably with those of Dr. Edgar and Dr. Rice using the ferrous sulphate salt, 5·4% of their patients being excluded from the investiga-

1. Maloney, J. V. jun., Elam, J. O., Hanford, S. W., Balla, G. A., Eastwood, D. W., Brown, E. S. *J. Amer. med. Ass.* 1953, **152**, 212.
2. Galpine, J. F., Smith-Clarke, G. T. *Lancet*, 1955, i, 722.
3. Smith-Clarke, G. T., Galpine, J. F. *Ibid*, 1955, i, 1299.

1. Gillhespy, R. O. *Med. ill.* 1955, **9**, no. 3.

tions owing to intolerance and 22·4% owing to inadequate response. Some may have failed to respond because they were suffering from a megaloblastic anæmia of pregnancy, which does not appear to have been excluded by examination of the bone-marrow.

Dudley Road Hospital, Birmingham. R. O. GILLHESPY.

PRODUCTION OF CODEINE

SIR,—The enzymatic dehydroxylation of phenols, which Mr. L. M. Spalton (March 24) claims is non-existent, is not an uncommon reaction. Burton [1] has shown that dopa-melanin is formed by the elimination of water between phenolic hydroxy groups. A large number of analogous reactions have been reported.[2]

Winnipeg, Canada. E. P. EVANS.

CARRAGEEN

SIR,—In your issue of April 14 a Peripatetic Correspondent says that he often wonders what chondrus or carrageen is.

Carrageen is familiar to most people in Ireland and often is consumed as a sweet there. It is a small seaweed, which has curly, branching fronds. It is harvested on the shore and is washed and then dried and bleached in the open.

It may be purchased loose from sacks in grocers' shops in towns near where it is harvested and elsewhere in packets in which it may be inspected through a transparent window. It is packed loosely and is very light for its bulk.

Nowadays its commonest use is for making a sweet which is a cross between jelly and blancmange, with a delicate flavour. It is soaked for some hours in water and then discarded, the decanted liquid being heated with milk, which may be coloured at will and which some misguided persons also flavour artificially. The agar-like gel extracted by soaking causes the milk when cooled to set. The resulting dish is light and readily taken in large quantity. Hence it has a place in the diet of invalids.

Its other medical interest lies in the fact that from ancient times it has been thought to have a value in the treatment of cough, being so used by the public to some extent even now and being incorporated in some commercial cough-remedies widely sold at present in Ireland. I doubt if it has any effect on cough apart from its soothing of the throat, but who am I to say that another Fleming may not at some later time say otherwise?

If your correspondent or others not familiar with this weed would like to try some, I should be happy to oblige.

Uarán Mór, Gaillimh, Eire. SEAGHÁN UA CONCHUBHAIR.

THE PATTERN OF GENERAL PRACTICE

SIR,—I should like to thank Dr. Richards (May 5) for telling us something of his experience of general practice and its relationship to medical education. Though he said little that was new he presented many of the important facts and feelings in a connected and convincing way.

For those who work and teach in hospital this kind of communication is most helpful, and I hope that other family doctors in differing types of practice will be encouraged to follow Dr. Richards's example. All medical practice, including general practice, requires both general professional education and specialised training. In planning this for the undergraduate and early graduate stages we need to know more precisely than we do at present what are the proper functions of a family doctor today. This is essential if the doctor in training is to make serious contact at appropriate points with the attitudes and experiences of family practice.

I hope myself that at the undergraduate stage this contact will be limited, that in the preregistration stage we shall one day find time for a substantial apprenticeship for all in general practice, and that during the years of established professional activity we shall step out beyond the occasional "round" and the afternoon "course" into more imaginative forms of contact between the general practitioner and the specialist.

Newcastle upon Tyne. DONALD COURT.

1. Burton, H. *Nature, Lond.* 1948, **161**, 725.
2. Mason, H. S. *Advanc. Enzymol.* 1955, **16**, 121.

RESEARCH DEFENCE SOCIETY

Dr. W. LANE-PETTER, hon. secretary of the Research Defence Society (11, Chandos Street, London, W.1), writes:

On more than one occasion recently there have been broadcast programmes on the subject of animal experiments in which doctors have taken part. May we, through the courtesy of your columns, invite any doctors or scientists who may be asked to take part in future programmes of this kind to remember that the Research Defence Society exists to help them in just this sort of activity.

DAPHNE AND THE GREENFINCHES

Mr. MAX PETTERSSON, PH.D. (Linnean Society, Burlington House, Piccadilly, London, W.1), writes:

In the classical myth Daphne was persecuted by Apollo; while in contemporary gardens her namesake, *Daphne mezereum* L., is newly set upon by greenfinches. (This daphne species is the small shrub covered with a profusion of pink and fragrant blossom about March.) A pair of greenfinches will gouge out every single seed, in May or June, and before the fruit is mature—to feed themselves and their nestlings. To study the origin and spread of this new habit, I should be glad to hear of cases where this does, or does not, happen; and, if it does, about how many years ago the first despoliation took place. Further details are given in *Nature* (April 14, 1956, p. 709).

Public Health

Contaminated Flour?

AT Pontardawe, Glamorgan, over 100 people were affected in an outbreak thought to be due to contaminated flour. The first to be taken ill were those who had had bread rolls in a canteen. Later, cases became more general in the village. The illness began one to three hours after eating the bread. Those most severely affected had epileptiform fits, sometimes accompanied by violent muscular contractions and followed by unconsciousness for up to one hour. In milder cases there was weakness, twitching, nausea, and confusion of thought. Some people became aggressive. They all recovered, but a number were injured when they fell. Inquiries suggest that 3 sacks of flour out of a consignment of 100 were contaminated—perhaps by coming in contact with some toxic substance. Samples are being analysed.

Help for the Family

Kent County Council recently completed the first year of a family-help service to households where there was temporary difficulty in looking after the children in their mothers' absence. The aims of the service were to avoid breaking up the family and to reduce the cost of taking the children into the care of the county council. It was limited to families of 2 or more children, with an initial term of not more than three months, and a contribution was assessed on the parents' means.

The helpers were recruited mainly from the council's domestic help service, and they either lived in or visited daily. 1090 children in 302 families were helped in that way during the year, with an average of twenty-four days per family. The cost of £5400 was estimated to be less than half the expense of taking them into the council's care.

94% of the cases were the result of confinements or treatment in hospitals and convalescent homes, and the remainder were due to deaths or desertions. 126 further applications for the service were not granted; most of those families made their own arrangements, and only 12 children had to be taken into care by institutions or foster parents. Although it was intended that help should be withdrawn when the mother returned home, it proved necessary to extend it in some cases until she was able to cope with her children's needs.

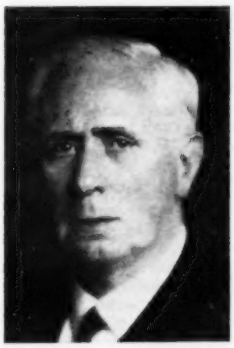
Only about 10% of the households presented special difficulties of the problem-family type, and the opportunity was taken to attempt some improvements in their way of life. The remaining 90% were helped to the mutual advantage of both the family and the county council. This valuable service seems likely to expand.

Obituary

SHELDON FRANCIS DUDLEY

K.C.B., O.B.E., M.D. Lond., LL.D. Edin., F.R.C.P., F.R.S.

Sheldon Dudley was born in the Royal Naval sick-quarters at Lisbon in 1884, the son of Deputy Inspector-General John Dudley. He grew up in an age when sons, especially Service sons, followed in their father's footsteps, and he passed directly into the Royal Navy from St. Thomas's on qualifying in 1906. His life reflects the opportunities and limitations of the Naval Medical Service. He spent, as he once said, "twelve years at sea as a general practitioner" and practised as a part-time specialist in six subjects, winning distinction in all and for his research on immunology election to the fellowship of the Royal Society.



[Stoneman

When the 1914–18 war broke out, with service in Mediterranean and China stations already behind him, he was acting as pathologist and venereologist at the R.N. hospital at Chatham. During the war he also served as P.M.O. of the R.N. Air Service in Dunkirk and of H.M.H.S. *Agadir*. After the war he became pathologist at Haslar and at the R.N. Medical School, Greenwich. Here his research on the immunology of diphtheria was begun. Of these years H. J. P. writes:

"I was greatly privileged to know Sheldon Dudley during the most fruitful period of his research career when he was grappling with the control of diphtheria at the Royal Hospital School, Greenwich, and developing a practical and philosophic interest in epidemiology. With a changing population of 1000 boys, there had been no fewer than 385 cases of diphtheria between 1919 and 1927, mostly concentrated into two major epidemics. At that time artificial immunisation had not been started, and Dudley was able to use the material for initiating his well-known studies of herd immunity.

"An immunisation scheme for the school was authorised somewhat tardily in 1928, and resulted in the almost complete disappearance of clinically recognisable diphtheria. Dudley's success at Greenwich, and the observations made concurrently in fever hospitals and elsewhere that diphtheria could be virtually abolished even when exposure might be constant and intense, undoubtedly influenced the authorities in their decision to introduce the national immunisation campaign in 1940.

"Bacteriologist, statistician, immunologist, and epidemiologist, Dudley was of outstanding intelligence and originality of mind. A keen and persistent investigator, he used to good purpose the basic immunological knowledge derived from the laboratory experimentation of A. T. Glenny. I found it very stimulating to listen to his penetrating and practical survey of current problems. Pertinent questions were always being asked, and he had plenty of new ideas, none of which proved to be a bad one in retrospect—an exceptional achievement. Opportunities for further research were seldom wasted, and his notes were always kept so carefully and accurately that analysis of his data was relatively easy. His capacity for putting his finger on essential details undoubtedly served him well when he later shouldered heavy administrative responsibilities."

In 1930, after a further spell of service at sea, he was promoted surgeon captain and returned to Greenwich as director of medical studies and naval hygiene at the medical school. In 1935 he was appointed M.D.G. and three years later medical officer in charge of the R.N. Hospitals at Chatham. After 1941 his appointment as medical director-general in years of strenuous warfare filled his days with administration to the exclusion of research and clinical medicine. Of this inevitable but frustrating separation and of its effect on Surgeon Vice-Admiral Dudley's last years a colleague writes:

"As a research-worker Dudley possessed outstanding gifts—vision, scrupulous honesty, a capacity for taking infinite pains, and a comprehensive grasp of a problem. These qualities were happily revealed while he was medical officer in charge of the Royal Naval Medical School at Greenwich in 1930–32, when his work on immunisation against diphtheria was carried out. For this research he used the boys at the Royal Hospital School, then occupying the buildings which now house the National Maritime Museum, and it was from his study of the results of the Schick test that he developed his theory of herd immunity. His approach was impersonal: the boys were a perfectly controlled sample of the human herd, and a sick-berth staff dormitory in a naval hospital or a room at a Royal Naval barracks were ideal media in which to test his views on the spread of droplet infection. It was natural for him to enjoy working among statistics, and in their interpretation he showed the full power of his mind. This was never more brilliantly expressed than in his Milroy lectures of 1931 on the distribution of infectious diseases in the Royal Navy, in the preparation of which he analysed and reinterpreted all the returns made in the *Health of the Navy* since the inception of this blue-book. This work led to a close association with the late Major Greenwood and to Dudley's election to the fellowships of the Royal College of Physicians and the Royal Society.

"As a Gilbert Blane medallist Dudley was singled out for promotion, which inevitably but unfortunately removed him from research to administration. When he was appointed medical director-general in 1941 he had to assume a heavy burden at a critical period. It was lightened for him only by the interest he felt in the many research problems created by the need for protection from new weapons or in new conditions. But he could not give this interest free rein, and while his representatives on the Medical Research Council's committees occupied his chosen province, he himself was bound to administrative work.

"When 1944 came, and he was due to retire, the end of the war was in sight and it was felt unwise to change horses in midstream, and so he continued in office to the end. Perhaps the strain had been greater than he or anyone else had realised, and when he was free at last to return to research he appeared unable to summon the energy. Instead he became medical officer in charge of the Royal Naval Hospital at Bermuda, thus coming to serve as a surgeon captain in the island where the former director-general of the Army Medical Services was to become governor. He held the office for nearly two years, and then entered on a final retirement from which he emerged only with the publication of two books—*The Four Pillars of Wisdom* and *Our National Ill-Health Service*."

R. C. M. adds:

"I had known Sir Sheldon very many years, but did not fully appreciate his great attributes and virtues until I had the pleasure and privilege of serving with him in the Medical Department, Admiralty, during the turbulent years of World War II. He was rather reserved and it was difficult for strangers to break the ice, but once that was done there was revealed a kindly, humble, honest, and very human being.

His main interest in life was highly scientific epidemiology, embracing bacteriology and allied science. I could not help but feel that he placed medical administration on a much lower level than his epidemiology! His outlook was philosophical in its widest sense.

However, in spite of his essentially professional make-up he was always very helpful in administrative matters. He remained calm when chaos reigned, and always gave a sound, lucid, and logical decision under trying circumstances. His sense of humour never left him, and it was very profitable indeed to listen to him expounding some immunological or other theory during a convivial evening in a medical mess.

During his active career he reinstated the Naval Medical Service in the medical world, and those of us who knew him will always remember his friendly smile. His advice was always encouraging and of great value. His wisdom was prodigious."

CUTHBERT ALLAN SPRAWSON

Kt., C.I.E., M.D. Lond., D. Litt. Lucknow, F.R.C.P.

Sir Cuthbert Sprawson, whose death on May 7 at the age of 79 we announced last week, held high administrative and university appointments in India at a time which was important for the future of the medical profession there. As director-general of the Indian Medical Service, as professor of medicine in the University of Lucknow, and as the first president of the Medical Council of India he made a lasting contribution to the land which he served for nearly forty years.

[Stoneman

He was born at Wimbledon and educated at King's College School and King's College Hospital, qualifying in 1898. Two years later he joined the I.M.S. and at Netley he won the Herbert prize and the Montefiore medal and prize. He held posts as deputy sanitary commissioner in the United Provinces and as civil surgeon at Jhansi before he was appointed professor of physiology at Lucknow Medical College in 1911. In 1913 he became professor of medicine at the college. During the 1914–18 war he left India to serve as a consulting physician with the Mesopotamia Expeditionary Force. In 1919 he was elected F.R.C.P. and appointed C.I.E.

In 1920 he returned to his work at Lucknow, and on the formation of the university there he was appointed professor of medicine and dean of the medical faculty. The university conferred on him the honorary degree of D.LITT., and J. W. D. M. writes:

"The award of this distinction by an Indian University to an I.M.S. officer may well have been to some extent a tribute to his remarkable personality which ensured for him the friendship and confidence of people of every race and class. This power of inspiring trust and affection was also the secret of his ability to maintain harmony among the students of different classes and communities who were living together in the hostel of the college. His example of disinterested friendship was far more effective in this respect than disciplinary measures would have been. He was an accomplished physician and teacher of medicine; he never ceased to be also a student and a seeker after fresh knowledge."

In 1930 he was promoted major-general and became inspector-general of civil hospitals in the United Provinces and surgeon-general with the government of Madras. Three years later he was appointed director-general of the I.M.S. During his term of office the Medical Council of India was set up to establish a uniform standard of higher qualification in medicine for all provinces. For the first four years the president of the council was nominated by the governor-general, and Sprawson became the first president. He retired in 1937, but his interest and his influence continued. He published an important survey of the teaching standards and of the facilities at Indian medical schools which was the basis of an All-India conference in 1938. This conference recommended the gradual abolition of the inferior licentiate medical qualification throughout India, and the upgrading, by stages, of the schools to college status. These proposals became effective in one province before the late war interrupted progress, and to some extent paved the way to the commissioning of licentiates as medical officers in the I.A.M.C. which was created in 1943.

G. R. McR. writes:

"Throughout his service it happened that Sprawson occupied posts at a time when events of importance were taking place. His appointment to Lucknow University gave him an opportunity to make his influence felt during its critical formative years; in Mesopotamia his experience of the nutritional needs of Indian soldiers and his knowledge of their reactions to disease was complementary to the wider experience of diseases of temperate climates possessed by his British Service colleague, W. H. Willcox: the pair made an admirable consulting team. When surgeon-general with the Government of Madras he succeeded in opening the teaching hospitals to highly qualified members of the independent medical profession as honorary members of the consulting and teaching staffs. As director-general it was fitting that he was the first president of the All-India Medical Council. He strove hard to put the new council on a strong foundation before the first non-official president, Dr. B. C. Roy, took charge. At all times Sprawson bore in mind the main objective—to prepare for the eventual hand-over to Indian successors. His work as professor, principal, inspector, and director-general was steadfastly directed to that end.

"The pulmonary infection which laid him low from time to time might have daunted a lesser man. He carried on resolutely in his own determined fashion—sometimes at odds with those in high places. In addition to his official work he was greatly interested in tuberculosis and leprosy work. He was a valiant campaigner in both causes while in India. After retirement he was an active member of the medical committee of the British Empire Leprosy Relief Association until his death."

Sir Cuthbert married in 1901 Miss Theodora Mary Burton, who died in 1912. He is survived by a son and a daughter.

ROBERT PAUL SCOTT MASON

M.C., F.R.C.S.

Robert Paul Scott Mason, surgeon to the United Birmingham Hospitals, died on May 3, only two days after his 63rd birthday. His origins were cosmopolitan, for he was born in Brest of a French mother, and spent his early years in the Far East. It was even said that he could speak Japanese before his native tongue. These early vicissitudes were due to his father's peripatetic profession, that of a naval officer who had been a wrangler and whose mathematical talents were bent to the science of gunnery. Tradition did not dictate that Scott Mason should follow his father's career; after leaving Portsmouth Grammar School he turned to medicine, entering Middlesex Hospital Medical School in 1910, where he came under the influence of Bland-Sutton, Pearce Gould, and Sir Gordon Gordon-Taylor. Soon after he qualified in 1915 he joined the R.A.M.C., and as regimental officer to the artillery in the 18th division early proved his remarkable courage, for which he later received an immediate award of the M.C. His courage was manifest again during the last eighteen months of his life when, though he was seriously ailing, he continued to fulfil his duties both as senior surgeon and adviser within his own hospital, and as vice-president of the Royal College of Surgeons.

[Fayer

After the first world war he returned to Middlesex Hospital to work under Sir Gordon Gordon-Taylor, then went to Bradford General Infirmary as resident surgical officer before holding a similar position at the Birmingham General Hospital. Here his surgical skill soon won the respect of his discerning seniors such as Seymour Barling. From the time of his election to the honorary staff of that hospital, and the Children's Hospital in 1925, his reputation as a general surgeon with thoracic interests and a particular facility in gastro-intestinal work grew until in his maturity he was recognised in the Midlands as an outstanding abdominal surgeon. He was elected to the council of the Royal College of Surgeons in 1946 and in 1955 became a vice-president.

B. N. B. writes: "Scott Mason's operating was a delight to behold, being the acme of gentleness; there were never any histrionic flourishes, no alarums and excursions, and each

case was carried steadily and purposefully to its proper conclusion. He seldom spoke about his surgical work; the more's the pity that we shall not hear his Bradshaw lecture which was to be given this year. Though shy and somewhat ill at ease on the platform, he was a most effective speaker in committee, where he never said an unnecessary word; when he spoke he did so with wisdom and to the purpose, sometimes even trenchantly, for his character displayed a nice blend of firmness with quiet and somewhat reserved friendliness. As a chairman he had no superior, hardly a peer. Business was conducted with expedition and yet every member was heard; younger members of the staff of his hospital were thankful to find a chairman prepared to give attention and consideration to their views. His actions and judgments were tempered by a strong sense of fairness and justice; he was thus able to contribute in no small measure to the happy relation existing between his hospital and the university. At the Royal College of Surgeons, as in his hospital, his gifts as a counsellor soon became evident. But it will be as a private counsellor (his advice was often sought on personal matters) that he will be remembered by many; as a raconteur who would enliven his colleagues with stories culled from his experience and told with his especial brand of humour and charm; and as a friend."

Mr. Scott Mason leaves a widow, Dr. Helen Fox, the anæsthetist, and two sons and a daughter.

HYACINTH BERNARD WENCESLAUS MORGAN
M.D. Glasg.

Dr. H. B. Morgan, who died at his home in London on May 7, was for the last fifteen years one of the small band of medical members of Parliament. He was also medical adviser and consultant specialist on industrial disease to the Trades Union Congress, and many of his contributions to parliamentary debates reflected his interest in industrial medicine and his wide experience of its problems.

[Daily Herald

He was born in Grenada in the West Indies and obtained much of his education through his own efforts. He won a scholarship at the Grenada grammar school, and after working as a civil servant there he saved a little money and came to this country to study medicine. At Glasgow University, with the help of scholarships and bursaries, he managed to complete his course and in 1909 he graduated M.B. The same year he won the Scottish inter-university McCunn research scholarship. Soon afterwards, he came to London and held house-appointments at several hospitals, including Great Ormond Street. In 1914 he obtained his M.D. with commendation and also took the D.P.H.

During the 1914–18 war he served as a surgical specialist at Horton War Hospital. After he was demobilised he settled in practice at Greenwich and also for some years held a part-time appointment under the Ministry of Pensions. As a student in Glasgow he had become interested in politics. He now turned to them again and stood as a Labour candidate for the London County Council in Greenwich in 1922 and again in 1925. Later, after he moved his practice to Camberwell, he stood unsuccessfully for North-West Camberwell in several parliamentary elections. He was finally elected in 1929, only to be unseated in 1931. He did not return to the House of Commons until 1940, but after that he sat continuously until he retired last year. He represented in turn Rochdale and Warrington.

His last years in private practice, before he retired in 1931, were spent in Paddington. He also held several consulting posts with trade unions, including the Union of Post Office Workers, and these led to his appointment as medical adviser to the T.U.C. He was a consulting physician to the Manor House Hospital and he held the Louis Starling lectureship on industrial diseases.

Dr. Barnett Stross, M.P., writes:

"For many years before I was elected to serve in Parliament I knew Dr. Morgan. I had heard him lecture on industrial disease and on many occasions corresponded with him. He was the most approachable of men and always delighted to help a colleague with advice and give assistance from his own varied and wide knowledge. On the subject of the injured or diseased worker he was a zealot and an enthusiast. Every case he advised on was to him a living issue. He saw the social background and suffering of those who were deprived of their means of livelihood almost as a personal problem. He struggled against injustice as if it were always directed against his own person. When he showed suspicion and intolerance of authority it was because he was ever watchful on behalf of those whom authority might oppress.

"I never knew him speak slightingly in private conversation of any one in the House. He combined a most redoubtable capacity for public controversy with personal charm. Everyone liked him and those who knew him longest miss him most."

In 1930 Dr. Morgan married Miss Mary Powell, who survives him with two daughters.

Diary of the Week

MAY 20 TO 26

Tuesday, 22nd

WRIGHT-FLEMING INSTITUTE OF MICROBIOLOGY
5 P.M. (St. Mary's Hospital Medical School, W.2.) Prof. F. W. Rogers Brambell, D.SC., F.R.S.: Transmission of Passive Immunity.

INSTITUTE OF NEUROLOGY, Queen Square, W.C.1
5 P.M. Dr. O. Magnus (Holland): Functional Localisation in the Amygdaloid Nuclear Complex.

INSTITUTE OF DERMATOLOGY, Lisle Street, W.C.2
5.30 P.M. Dr. L. Forman: Cutaneous Manifestations of Visceral Malignancy.

Wednesday, 23rd

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5 P.M. *Endocrinology.* Prof. A. C. Frazer: Dwarfism and some Nutritional Factors.

POSTGRADUATE MEDICAL SCHOOL OF LONDON, Ducane Road, W.12
2 P.M. Dr. E. S. Anderson: Enteric Phage-typing.

INSTITUTE OF DISEASES OF THE CHEST, Brompton, S.W.3
5 P.M. Dr. Kenneth Robson: Diagnosis of Bronchial Carcinoma.

INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. Arthur Tickner: Fats and the Skin.

BRITISH ASSOCIATION OF SPORT AND MEDICINE
5.30 P.M. (Westminster Hospital Medical School, Horseferry Road, S.W.1.) Prof. A. E. Kennedy: The Psychological Approach to Sport.

Thursday, 24th

POSTGRADUATE MEDICAL SCHOOL OF LONDON
4 P.M. Dr. Edwin Clarke: Hypertensive Encephalopathy.

INSTITUTE OF OBSTETRICS AND GYNÆCOLOGY
3 P.M. (Hammersmith Hospital, Ducane Road, W.12.) Prof. James Young: Pelvic Osteoarthropathy.

INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. J. O. Oliver: Animal Parasites in Skin Diseases.

BRITISH INSTITUTE OF RADIOLOGY
8.30 P.M. (32, Welbeck Street, W.1.) Prof. F. W. Spiers, D.SC.: Radioactivity in Man and his Environment. (Presidential address.)

NUFFIELD ORTHOPÆDIC CENTRE, Oxford
8.30 P.M. Mr. J. C. Scott: Influence of Stress on Structure.

UNIVERSITY OF ST. ANDREWS
5 P.M. (Queen's College, Small's Wynd, Dundee.) Dr. D. J. M. Mackenzie: Health Problems in an African Territory.

UNIVERSITY OF DUBLIN
4.30 P.M. (Trinity College.) Prof. A. St. G. Huggett: Environment of the Fœtus and Postnatal Health. (John Mallet Purser lecture.)

Friday, 25th

ROYAL COLLEGE OF OBSTETRICIANS AND GYNÆCOLOGISTS, 58, Queen Anne Street, W.1
5 P.M. Dr. Louis M. Hellman (New York): Tubal Plastic Operations. (Green-Armytage Anglo-American Sterility lectureship.)

ROYAL SOCIETY OF MEDICINE
5 P.M. *Pædiatrics.* Dr. F. J. W. Miller, Mr. Denis Browne: Tuberculous Cervical Adenitis.

POSTGRADUATE MEDICAL SCHOOL OF LONDON
10 A.M. Sir Gordon Gordon-Taylor: Malignant Disease in the Vicinity of the Hip-joint.

FACULTY OF RADIOLOGISTS
5 P.M. (Royal College of Surgeons, Lincoln's Inn Fields, W.C.2) Prof. Robert McWhirter: Prognosis in Breast Cancer.

ST. MARY'S HOSPITAL MEDICAL SCHOOL, Paddington, W.2
5 P.M. Prof. Gordon Lennox: Carcinoma of the Ovary.

GUY'S HOSPITAL MEDICAL SCHOOL, London Bridge, S.E.1
5 P.M. Prof. P. M. S. Blackett, F.R.S.: Elementary Particles of Nature. (Fison lecture.)

INSTITUTE OF LARYNGOLOGY AND OTOLOGY, 330, Gray's Inn Road, W.C.1
3.30 P.M. Mr. Wallace Black: Differential Diagnosis of Ulcers in the Mouth and Pharynx.

Notes and News

WORLD HEALTH ASSEMBLY

THE ninth World Health Assembly opened at Geneva on May 8, and it is expected that it will continue till May 26. The medical members of the United Kingdom delegation are Sir John Charles, Sir Eric Pridie, Dr. H. K. Cowan, and Dr. M. T. Morgan.

In his inaugural speech Prof. Jacques Parisot (France), the president, pointed out that national economics were based on human economy and that the productivity, welfare, and strength of a country were related to the "health-capital of the population." To improve health on an international level governments and peoples must unite. The world was growing smaller every day, inequalities in health were a danger to all and we needed a world-wide offensive not only against diseases of the body, but also against diseases of the mind and against the social inequalities which breed conflict. He was therefore especially glad to be able to welcome several new members to the World Health Organisation. Morocco, Tunisia, and Sudan were admitted to full membership and the Gold Coast, Nigeria, and Sierra Leone to associate membership. Professor Parisot regretted that the U.S.S.R.'s resumption of membership had been postponed.

Mr. Milton P. Siegel, the assistant director-general in charge of finance, was able to give an encouraging report of his department. The financial position of W.H.O., he said, was the best since its start in 1948. During 1955 92% of the total contributions due had been paid and substantial arrears collected. Dr. M. G. Candau, the director-general of W.H.O., reminded the assembly that the 1956 programme had had to be adapted to the budgetary level approved for 1955, though this did not meet even the minimum demands of member States. He hoped that the assembly would make it possible to meet those needs in 1957.

THE ROYAL SOCIETY

THE president and council of the Royal Society received guests at the annual conversazione on May 10 at Burlington House, where Science's latest was on exhibition. For those anxious to catch up with what had been going on in scientific corners other than their own, the evening was as attractive as usual. And for those who felt that they were too far behind to catch up with anything, there were many encouraging exhibits which gave a nice straightforward picture of such delights, for example, as the ceiling temperature phenomenon in addition polymerisation reactions.

Vitamin B_{12}, looking rather like an unknown political prisoner in some of the models, was the star of an effective demonstration arranged by Dr. Dorothy Hodgkin, Dr. E. Lester Smith, Prof. A. W. Johnson, and Sir Alexander Todd. By a combination of chemical and crystallographic evidence, the structural formula of B_{12} has been deciphered. The calculations established the presence in the molecule of a planar fragment with a structure clearly related to porphyrins, though in a quite unexpected way. Nearby Prof. W. D. M. Paton was considering the chemical transmission of nerve effects in the isolated intestine. No-one had been certain which of the muscle stimulants in the wall of the small intestine transmitted activity from the nervous structures there to the smooth muscle. By placing one electrode within the lumen and one outside the guineapig ileum, vigorous twitches were obtained with single shocks of 0·5 millisecond, and the preparation was found to be cholinergic in its properties. Moreover, when the tissue was treated with eserine, stimulation caused acetylcholine to appear in the bathing fluid in sufficient amounts to cause another unstimulated piece of intestine to contract.

The kaolin model glaciers were a great success and several enthusiasts regretted that they had left their ice-axes and crampons at home. Mr. W. V. Lewis and Mr. M. M. Miller, of the department of geography at Cambridge, worked hard at their model ice-falls down which they urged a mixture of one part kaolin to two parts water. The kaolin glaciers crevassed and flowed realistically; and dust was scattered on the surface to illustrate the movement of the summer accumulation between the cleaner snows of winter. The crowd watching the glaciers became so thick at times that they threatened to upset another formidable display of Nature's ingenuity—the model of the molecule (or rather a small part of the molecule) of deoxyribose nucleic acid, which had been constructed at the biophysics research unit of King's College, London. This strange substance seems to hold some of the secrets of the transmission of hereditary characteristics, and it may be that the arrangement of the atoms in the molecule forms a sort of "code" for the transmission of information from one generation to the next.

Those who feel that evolution is a dull business, which has aggravatingly failed to attune itself to the pace of modern life, should see Dr. H. B. D. Kettlewell's splendid film, *Evolution in Progress*, the story of natural selection and "industrial melanism." About 70 species of moth in this country are at the moment in the process of changing their complicated wing patterns, intended for concealment on lichened tree-trunks, boughs, or rocks, to all black, which is better suited to the dirty bark of industrial areas. This was first noted about 1840, and the rate at which the black forms are spreading is the most striking evolutionary change ever witnessed in any living organism. Dr. Kettlewell's study of these moths and the birds that prey on them was vividly illustrated in the film, which was taken by Dr. Niko Tinbergen. It showed how the birds are responsible for the virtual elimination of the white moths from polluted countryside, and how, in districts with purer airs, the black forms are the ones that get plucked from the clean lichened tree-trunks.

THE DESERT AND THE ROSE

WITH increasing populations the world's need of food continues to increase[1]; and, because there is not much unoccupied tillable land available for agriculture, more attention has been given to the possibility of breeding cattle and growing crops in the deserts.

In 1952 the Institute of Biology organised a symposium on the biology of deserts, and its proceedings have since been published.[2] Prof. Frank Debenham points out that deserts are characterised by extreme heat by day and extreme cold by night, requiring special adaptation in their fauna and flora. Brigadier R. A. Bagnold, F.R.S., goes into the question of water-supply and shows how man and the larger animals depend on nomadism for their existence in deserts. Prof. F. W. Shotton discusses the use of the underground water, which is usually too salt for irrigation. Dr. H. Boyko reminds us that, even if we find new sources of food in the natural vegetation of the deserts, the commercial production of them would be a complex problem; and Prof. Paul Vayssière shows that, as soon as introduced crops begin to grow, locusts immigrate to devour them. Tackling deserts from a different angle, Prof. E. P. Stebbing explains how they arise and how to stop existing deserts from expanding. Dr. J. S. Weiner discusses man's adaptability to the desert and claims that "disorders occurring purely as a result of the climate are to a large extent preventable and a matter of fairly simple hygiene"; but Dr. Edmond Sergent argues that it will not be feasible for either white or black colonists to *labour* in the desert. Whites could do the administrative work but could not till the soil. The only possible tillers of the soil of the deserts are the present inhabitants of those deserts, who will have to be helped to multiply so as to provide enough agriculturists. Mr. S. M. Manton, F.R.S., describes what he saw on a visit to Russia: afforestation schemes, hydro-electric developments for irrigation of Asian deserts, the tapping of underground water-supplies, and improved methods of cultivating the deserts. The new areas to be irrigated are said to equal in extent a third of the world's irrigated land, and the Russians hope that this transformation of the scene will produce for them a better climate, which in turn will enable more crops to be grown.

These are grandiose schemes, but do they constitute the right way of tackling the question of increased food-supplies? Prof. Hugh Nicol[3] holds that, in relation to the work it demands—making the underground water-supply available and arranging to drain it away; mining and grinding and transporting the necessary gypsum for dressing the land, and providing the fuel for all that—conversion of the desert into agricultural land does not give an adequate return in food. He points out, too, that industry, transport, and food-production are in competition for a limited supply of fossil fuels: phosphatic fertilisers *could*, with difficulty, be made

1. *Lancet*, 1950, i, 406; *Ibid*, 1954, i, 1023; *Ibid*, 1954, ii, 713.
2. Cloudsley-Thompson, J. L. Biology of Deserts. London: Institute of Biology. 1954. Pp. 224. 14*s*.
3. Nicol, H. Microbes and Us. Pelican Books. 1955. Pp. 272. 2*s*. 6*d*.

without sulphur; or elemental sulphur could be obtained from gypsum; but in either case, he says, it would be necessary to consume an extra amount of coal about equal to the weight of sulphur produced or replaced. The fixation of atmospheric nitrogen by the bacteria of leguminous plants is possible only if there is also an ample supply of phosphorus, calcium, magnesium, and sulphur, and the artificial fixation of atmospheric nitrogen by man depends on the use of coal both as a source of energy (though there it can presumably be replaced by nuclear fission) and for chemical reasons. So far, "the consumption of wasting assets has merely been shifted from nitrate to coal" about 5 tons of coal being needed to fix 1 ton of atmospheric nitrogen. Further, the more nitrogenous fertiliser is used the greater is the demand for alkaline earths. Therefore the more factories we build for making such fertiliser, the more lime and other earthy base we must supply not merely to neutralise the resultant acidification of the soil, but also for incorporation in the additional crops—the target of all this effort. Nicol tells us that $18^1/_2$ million tons of fertilisers will have to be provided to every 1 million tons of nitrogen produced synthetically from the air. Any extension of food-production will therefore depend on further chemical, engineering, and industrial effort leading to additional consumption of fuels and other wasting assets. Fuel, he remarks, "is as essential to food-production on a present-day scale as it is to the continued existence of air-lines."

At the end of all this endeavour, we must also take account of the tendency of the soil towards homœostasis. In Nicol's words: "Whatever man does towards raising the level of organic matter and available nitrogen in the soil, his efforts at striking a higher balance will be resisted and opposed by the soil microbes and other natural agencies. These agencies will coöperate to destroy and remove any unnatural excess of organic matter and to restore the proportion of organic matter to what is natural to the soil." Even when, in the ordinary course of affairs, the nitrifying bacteria of the soil convert ammonia or ammonium salts into nitric acid, a demand for alkalis is set up to neutralise the acidity, which is inimical to both the bacteria and the plants. Apart from supplying such alkalis there is no point in "feeding" the soil bacteria, which constitute a very finely balanced system. Increase in the supply of any one material merely throws the system out of equilibrium. The same principle applies to artificially irrigated land (including deserts): the natural equilibrium has been upset, and the price must be paid either in fuel or by going without the crops. Though, by sufficient effort, the desert can be made to blossom as a rose, we cannot expect much return from its cultivation unless we have the fuel to make fertilisers for it, to irrigate and drain it, and to distribute the food it grows.

A DAY HOSPITAL

A DAY hospital and treatment centre for 30 patients has been opened at Whitchurch Hospital, Glam. The former bakery and tailor and bootmaker's shops of the hospital have been converted by the maintenance staff into a two-storeyed building. On the ground floor there is a waiting-room and records room, accommodation for the visiting E.N.T. surgeon, dentist, and chiropodist and a group-therapy room with seating for 50 patients. On the first floor there are three consulting-rooms, a medical library, and a room for the clinical clerks. Patients will attend the hospital from 9 A.M. to 5 P.M. and will return to their own homes each evening. They will be selected from those attending psychiatric outpatient clinics and from among the convalescent hospital-inpatients who are ready to return home but who still need to continue their treatment. Dr. T. J. Hennelly, the superintendent, describes the new venture as providing treatment at the hospital rather than in the hospital.

University of Oxford

Dr. R. M. Bannerman has been elected to a Radcliffe travelling fellowship.

University of London

On March 21 the degree of M.S. was conferred on C. Naunton Morgan and R. J. H. Smith.

University of Glasgow

On April 30 the degree of PH.D. in medicine was conferred in absentia on Ian Macadam, B.SC

Royal College of Surgeons of England

At a meeting of the council on May 10, with Sir Harry Platt, the president, in the chair, Mr. A. Lawrence Abel was elected vice-president in place of the late Mr. Scott-Mason. Dr. Bernard Johnson (Middlesex Hospital) and Prof. M. Lucas Keene (Royal Free) were admitted to the fellowship, having been elected as medical practitioners of twenty years' standing. Mr. David Trevor (Charing Cross) was admitted to the court of examiners. Mr. Lawrence Abel was appointed Bradshaw lecturer for 1956.

The Cartwright prize for 1951–55 was presented to Mr. B. E. D. Cooke and a certificate of honourable mention to Mr. N. L. Rowe. The Robert Jones travelling fellowship was awarded to Mr. Michael Alms. The Gilbert Blane medal for 1956 was awarded to Surgeon Commander J. M. Holford, the Mitchiner medal to Lieut.-Colonel R. E. Waterston, and the Lady Cade medal to Air Commodore C. A. Rumball. The Begley prize was awarded to C. R. N. Ashbee (St. Bartholomew's Hospital Medical School).

Postgraduate diplomas and diplomas of membership were conferred on the candidates named in the report of the comitia of the Royal College of Physicians (*Lancet*, May 5, 1956, p. 644).

Royal College of Surgeons of Edinburgh

At a meeting of the college held on May 9, with Sir Walter Mercer, the president, in the chair, the following were admitted to the fellowship:

P. L. Berger, John Bingham, A. C. Bowring, M. E. J. Brightman, Ivan Coll, Harold Collinson, G. I. B. da Costa, G. A. Dalton, Prakash Chandra Dubey, D. B. Eaton, A. W. Eklund, C. A. Ezike, C. L. Greaves, M. B. Johnson, E. P. J. King, R. P. Leake, J. I. de Boer Leembruggen, D. O. Maisels, N. K. G. Mendis, J. H. Miller, A. H. Mizrachy, Hari Mohan, James Morgan, Nuggihalli Ranganath Aiyengar Narayan, K. G. Orr, J. R. Page, Hyman Perkin, Kamalesh Pandurang Prabhu, Mohammad Abdul Qayyum, L. A. Sarembock, F. W. Shea, C. A. Shearer, D. M. Sinclair, Dhurandhar Prasad Singh, R. D. Smith, B. D. Stringer, J. N. Tennant, I. C. K. Tough, Robert Yule.

University College of the West Indies

The University of London has taken this university into a special relation by which students of the college work for degrees of the university, the examinations for the degrees being held in Jamaica under the supervision of examiners appointed by the university. Students who pass obtain a full degree of the University of London as external students. Holders of the M.B., B.S. degrees obtained in this way are entitled, on application, to registration by the General Medical Council. The following have been successful:

Dorrit V. M. Box, L. M. Burke, C. J. Charles, D. E. Christian, R. I. Forbes, H. R. Francis, B. A. Q. Hamilton-Smith, K. A. W. McKenzie, O. D. O. Minott, D. B. Mitchell, Pamela E. B. Rodgers, A. R. Walwyn, M. O. Woo-Ming (October, 1954); Betty Milbourne Clark (April, 1955); L. B. Bannister, T. E. Been, R. K. Berry, F. N. Boland, G. B. P. Cummins, Barbara E. Johnson, S. S. Lutchman, Myrtle E. Mitchell, D. I. M. Picou, Premchand Narpat Ratan, N. L. Read, R. O. Saunders, K. L. Standard, K. M. W. Tang, Norma C. M. Theobalds (October, 1955).

London College of Osteopathy

The Leverhulme Trust Fund is providing scholarships to enable qualified medical men and women to study osteopathy at this college. They will cover the cost of fees and maintenance. The course begins next October, and application should be made before June 30. Particulars may be had from the secretary of the college, 24, Dorset Square, London, N.W.1.

Royal Northern Hospital, London

This hospital is celebrating its centenary from June 25 to 30 this year. The programme includes medical and surgical demonstrations at the hospital and a dinner at the Royal College of Surgeons on June 26, which the Duke of Gloucester will attend.

Royal Medical Benevolent Fund

The annual general meeting of this Fund will be held on Tuesday, June 5, at 5 P.M., at 11, Chandos Street, London, W.1, with Lord Webb-Johnson, the president, in the chair.

Hunterian Society

The subject for the gold medal essay of 1956 is the Care of the Growing Child in General Practice. The competition is open to all doctors in general practice. Further details may be had from the hon. secretary of the society, Mr. R. S. Murley, 95, Harley Street, London, W.1.

British Association for the Advancement of Science

The annual meeting of this association will be held in Sheffield from Aug. 20 to Sept. 5. Further particulars may be had from the association, Burlington House, Piccadilly, London, W.1.

British Epilepsy Association

The annual meeting of the association will be held on Thursday, May 31, at 2.30 P.M., at Manson House, Portland Place, London, W.1, when Sir Henry Cohen will speak.

The Doctor as Witness

On Monday, June 4, at 8.15 P.M., at the Marlborough Day Hospital, 38, Marlborough Place, London, N.W.8, Dr. J. C. M. Matheson, principal medical officer of Brixton Prison, will speak on the Doctor as Expert Witness in Criminal Courts.

London Amateur Boxing Association

A meeting of the medical officers of this association will be held at the Great Northern Hotel, King's Cross, London, on Thursday, May 31, at 7.30 P.M., when Mr. Ian Robin will give a talk on ear, nose, and throat injuries.

Convalescent Home for Diabetics

A convalescent home, which is open to male diabetics over 12 years of age from all parts of the country, has been opened by Sheffield Regional Hospital Board at Langwith Lodge, Nether Langwith, Notts. Application forms are obtainable from the matron.

Growth and Development of Children

The annual meeting of the teams engaged on coördinated research on the growth and development of children will take place in London on July 9 and 10, at the Child Study Centre, Brunswick Square, W.C.1, under the chairmanship of Prof. Alan Moncrieff. These annual meetings are sponsored by the Centre International de l'Enfance, Paris. It is hoped that representatives of teams from London, Paris, Zürich, Brussels, Stockholm, Kampala, Dakar, and Louisville will be present.

W.H.O. Appointments

Dr. Jessie Bierman, professor of maternal and child health at the University of California School of Public Health, has been appointed to the headquarters staff of the World Health Organisation as chief of the section of maternal and child health. The appointment is also announced of Dr. E. E. Krapf, associate professor of psychiatry in the University of Buenos Aires, as chief of the mental-health section.

North of England Otolaryngological Society

The prize which this society offers for original work in otolaryngology carried out in the North of England during the tenure of a senior-registrar, registrar, house-officer, or clinical-assistant post has been awarded this year to Mr. R. W. Bailie for his paper on Lermoyez syndrome. Entries for next year should be sent to the hon. secretary, Mr. R. Thomas, 27, High Petergate, York, before Aug. 1, 1957.

Joint Cancer Consultation Clinics

The experiment in cancer treatment first organised by the Royal Marsden Hospital (then the Royal Cancer Hospital) in 1944 was described in our annotation of May 5. On May 11 and 12 the coöperating hospitals held their first general meeting, and there was a dinner to celebrate the 12th anniversary of the inception of the joint clinics. Mr. J. M. Wallace, a governor of the Royal Marsden Hospital, was in the chair, and Miss Patricia Hornsby-Smith, parliamentary secretary to the Ministry of Health, was the chief guest. Proposing The Coöperating Hospitals Scheme, she said it was as much a matter of human relations as of science, and it had added a new dignity and meaning to the oft-repeated precept that the patient came first. Speaking of nuclear energy in medicine, Miss Hornsby-Smith emphasised the value of the work going on in many different hospitals and laboratories: she often had to answer aggravating questions from people who assumed that research began and ended in the laboratory at Mill Hill. Sir Max Page replied on behalf of the hospitals. Prof. D. W. Smithers, welcoming the guests, wondered whether the joint clinics might not prove to be a pilot scheme for other regions and other specialties. Sir Harry Platt responded for the guests.

R.A.F. Appointments

The following appointments in the Royal Air Force have been announced: Dr. D. Evan Bedford, civilian consultant in cardiology; Prof. C. V. Harrison, honorary civilian consultant in pathology; and Mr. C. Naunton-Morgan, civilian consultant in surgery.

Appeal to Congress Organisers

One of the objects of the Council for International Organisations of Medical Sciences (C.I.O.M.S.) is to coördinate international congresses of medical and related sciences. To avoid overlapping, congress organisers are asked to inform the C.I.O.M.S. (Unesco House, 19, Avenue Kléber, Paris 16e) of their plans before fixing the dates of their meeting.

Education of Subnormal Children

On May 9 Mr. Dennis Vosper, parliamentary secretary to the Ministry of Education, opened a school for educationally subnormal children in Brighton. Provision for these children had been increased since the war but about 12,500 children were still waiting admission to special schools. Though most of them were in ordinary schools. Mr. Vosper said that a further 75 special schools, providing nearly 9000 places were in course of construction or had been authorised. Though the number of special-school places had increased by 10,000 since 1949 the number of children awaiting places had remained almost constant. "This clearly shows," Mr. Vosper said, "that we are all taking greater trouble in ascertaining the existence of this form of handicap. Children who previously might have been left to cope alone with their disability are now seen more clearly to need assistance."

British Society for Research on Ageing

The annual meeting of this society will be held at the Ciba Foundation, 41, Portland Place, London, W.1, on Friday, June 8, at 4 P.M. This will be followed by a scientific meeting, open to non-members, when Prof. K. J. Franklin and others will speak on reactions to standard stimuli at various ages, and Miss Honor Fell, F.R.S., on the effect of vitamin A on embryonic epidermis of different ages.

A joint meeting with Dutch Gerontologists in Amsterdam has been planned for July 27 and 28, before the International Physiological Congress in Brussels on July 30. Further particulars may be had from Mr. G. H. Bourne, D.SC., London Hospital Medical College, Turner Street, London, E.1.

The Royal College of Surgeons of England have sent their congratulations to Mr. Gerald S. Hughes, of York, who has completed 50 years as a fellow of the college.

Central Council for District Nursing in London.—The council has published a supplement to their directory and streets list. The supplement includes new blocks of flats and the roads which serve them. Copies (*1s. 6d.*) may be had from the council, 25, Cockspur Street, S.W.1.

A new edition of the Home Office pamphlet on *Duties of Doctors and Dentists under the Dangerous Drugs Act and Regulations* has been issued (H.M. Stationery Office. Pp. 16. *9d.*).

Appointments

BLACK, DAVID, M.B. Belf., D.O.M.S.: part-time asst. ophthalmologist, Walton Hospital, Liverpool.

GRIMBLE, A. S., M.D. Lond., M.R.C.P.: director of the department of venereal diseases, Guy's Hospital, London.

YOUNG, W. B., M.B.E., B.M. Oxfd, F.R.C.S.E., D.M.R., D.T.M.: asst. radiologist, St. Thomas's Hospital, London.

Colonial Appointments:

ADAMS, M. D., M.B. N.U.I.: special grade M.O., Kenya.

BEDFORD, P. W., M.B. Leeds: M.O., Sarawak.

BRINGAN, J. W., L.R.C.P., D.P.H.: M.O.H., Gambia.

CHEUNG, K. H., M.B. Hong-Kong, D.T.M. & H.: malariologist, Hong-Kong.

CLARK, A. R. L., M.B.: resident M.O. (intern), Uganda.

HO YUEN, M.R.C.P.: specialist physician, grade G, Singapore.

JUMEAUX, C. V., M.B.E., F.R.C.S.E.: specialist officer, superscale grade A, Federation of Malaya.

MAGEE, T. P., M.B. Glasg., M.R.C.O.G.: M.O., grade A, Trinidad.

PARKER, D. J. P., M.B. Belf., F.R.C.S.E.: senior specialist, northern region, Nigeria.

PORTSMOUTH, O. H. D., M.B. Lond.: M.O., Kenya.

QUARCOO, E. G. K., L.R.C.P.I.: M.O., Gold Coast.

SHOUCAIR, E. S., M.D. Edin., M.R.C.P.: medical specialist, Jamaica.

SMARTT, C. G. F., M.R.C.S., D.T.M. & H.: specialist psychiatrist, Tanganyika.

YIP-CHOY, R. T., M.B. Lond.: M.O., grade C, Trinidad.

in senile pruritus vulvae...

KOLPON

When the problem is the rehabilitation of the hypo-oestrogenic vagina, Oestrone, in the form of Kolpon Pessaries, will be found to be uniformly and strikingly effective.

Pessaries
(IMPROVED FORMULA)

Dose
One pessary each night or on alternative nights while symptoms persist.

Packing
Each pessary contains 1.0 mg. in water soluble wax base in 5's and 25's.

ORGANON LABORATORIES LTD.
BRETTENHAM HOUSE · LANCASTER PLACE · W.C.2
Telephone : TEMple Bar 6785/6/7, 0251/2. Telegrams : Menformon, Rand, London

The secret of sleep . . .

in a capsule

Lilly

BARBITURATES

'SECONAL SODIUM'
Quick onset—short duration.
In 'Pulvules' ¾ gr. and 1½ grs.

'SODIUM AMYTAL'
Medium onset and duration.
In 'Pulvules' 1 gr. and 3 grs.

'TUINAL'
Quick onset—medium duration.
In 'Pulvules' 1½ grs. and 3 grs.

ELI LILLY & COMPANY LIMITED, BASINGSTOKE, HANTS

He could not be enjoying himself more. But tomorrow he is going into hospital. There's nothing seriously wrong with him, but the time has come when he must put his trust in doctors and nurses.

And they, in their turn, put their faith in BRITISH OXYGEN equipment and gases. In thousands of cases, every day, BRITISH OXYGEN equipment and gases are used to ease pain and to save lives.

BOC **BRITISH OXYGEN**

BRITISH OXYGEN GASES LTD., MEDICAL DIVISION, GREAT WEST ROAD, BRENTFORD, MIDDLESEX

Makers and suppliers of anaesthetic, analgesic and therapeutic equipment and gases

Teamwork in surgery

Behind the small, highly trained team in the operating theatre, there stands another team, trained for different work, but equally painstaking, enthusiastic and accurate.

This supporting team produces the equipment which makes modern operative techniques possible. And scalpels are an important item of this equipment. Every Swann-Morton scalpel blade is individually inspected, each of the traditional shapes identical to pattern, perfectly tempered, ground and finished.

Produced in a model factory in Sheffield, Swann-Morton blades are in growing demand all over the world.

Swann-Morton
SURGICAL BLADES AND HANDLES

3 types of handle—
11 traditional shapes of blade
Order from your usual wholesaler

W. R. SWANN & CO. LTD., SHEFFIELD 6, ENGLAND

411FC

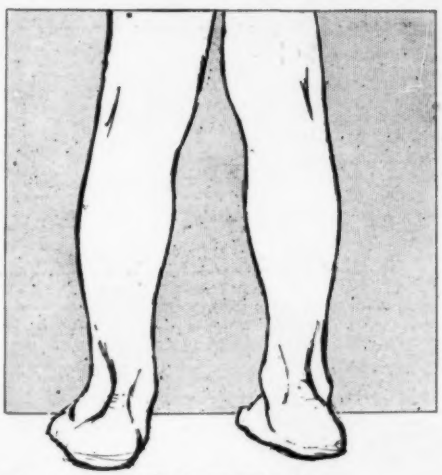
How do *YOU* tackle flat foot?

. . . do you prescribe an external wedge on the shoes?

BUT the wedges soon wear away; and very often the child is made to feel self-conscious because his shoes look different from other children's.

Surely it's more logical to have a wedge *built-in* between the inner and outer sole—invisible, and completely unaffected by wear or repair of the shoe. That is how Start-rite INNERAZE shoes are made; why they are the only practical solution to this problem.

Information from Mr. W. J. Peake, James Southall & Co. Ltd., Crome Road, Norwich.



INNERAZE

Invisible Wedge shoes by START-RITE

(*who make the finest children's shoes of all types*)

Inneraze Shoes are supplied only against medical prescription

BURSON 'LASTEX'
Surgical Stockings

Specify "Burson" for Two-Way Stretch

★ Uniform tension, easily adjustable
★ Strength at points of greatest strain
★ Lightness and coolness for comfort
★ Expert fashioning for exact fitting

Burson Elastic Stockings are made from the finest 'Lastex' yarn to give them a special two-way stretch. And the complete size range of Burson Hosiery ensures a perfect fitting in every case.

RYOTOL
for
Chronic Discharge of the Ear

because

RYOTOL is lethal to Ps. Pyocyanea, Staphylococcus aureus, Proteus vulgaris and Streptococcus pyogenes found in C.S.O.M. and Otitis Externa.

The presence of Ps. Pyocyanea has been demonstrated in 90% of cases of chronically discharging ears. This gram-negative, highly resistant organism is unaffected by penicillin, sulphonamides and many other bactericides. It produces abundant pus and is therefore extremely troublesome.

RYOTOL Ear Drops are the outcome of official clinical work on humans, following outstanding results obtained in the veterinary field.

Formula:

Monophenyl ether of ethylene glycol	2.0% v/v
Phenylmercuric Nitrate	0.1 %w/v
Phenyl-dimethyl iso-pyrazolone in a stabilised non-irritant base	5 %w/v

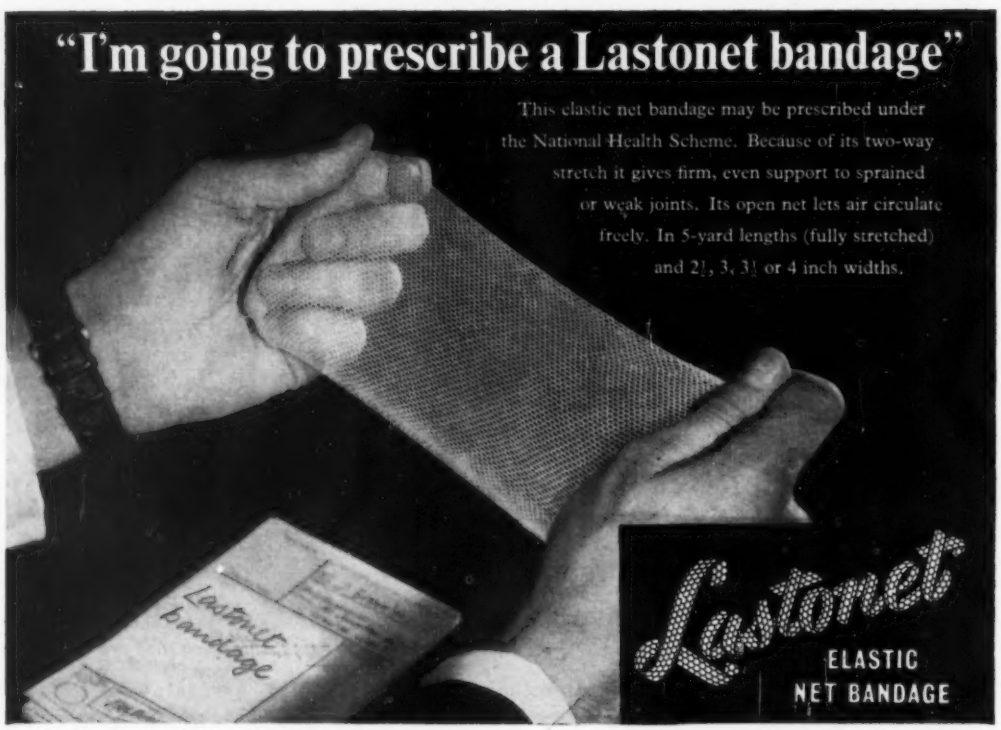
Samples and literature gladly forwarded on request.

RYBAR LABORATORIES LTD.
TANKERTON · KENT

P.B.44

"I'm going to prescribe a Lastonet bandage"

This elastic net bandage may be prescribed under the National Health Scheme. Because of its two-way stretch it gives firm, even support to sprained or weak joints. Its open net lets air circulate freely. In 5-yard lengths (fully stretched) and 2½, 3, 3½ or 4 inch widths.



LASTONET PRODUCTS LTD, CARN BREA, REDRUTH, CORNWALL Φ13

FROM ALL LEADING SURGICAL SUPPLY HOUSES

Blades in packets of 6. Handles packed singly

The PARAGON RAZOR CO. SHEFFIELD ENGLAND

WHEN PRESCRIBING CHLORODYNE
medical men should be particular to specify

Dr. J. Collis Browne's
CHLORODYNE

The Original and only genuine Chlorodyne

used with unvarying success by the Medical Profession in all parts of the world for over 100 YEARS

Always insist on "Dr. Collis Browne's"

THERE IS NO SUBSTITUTE

Phenoxetol

THE WELL-KNOWN ANTISEPTIC AGAINST GRAM-NEGATIVE ORGANISMS

Sole Distributors for the United Kingdom
P. SAMUELSON & CO
1, CRUTCHED FRIARS, LONDON, E.C.3
Telephone: ROYAL 2117/8

The moment you hated most...

Don't let this happen to you. Fit Dunlop Tubeless and remove the risk of arriving wet and bedraggled, as well as late. Dunlop Tubeless virtually eliminate puncture delays and roadside wheel-changing, greatly reduce the possibility of bursts or damage through impact or under-inflation, keep your brow uncreased for many miles of trouble-free motoring. In fact, except for major or freak penetrations, a nail or other sharp object can be left in the tyre, extracted when convenient to you and the hole sealed . . . without removing the tyre! For punctuality without punctures . . .

Fit DUNLOP TUBELESS

* *Sold at the same price as the ordinary cover and tube, Dunlop Tubeless are available for wheels of 16″ or less in diameter (except wire type). They are easily fitted and maintained and can be remoulded, too — by Dunlop.*

6H/105A

Let your money earn maximum interest with security

STATE BUILDING SOCIETY
(Established 1931)

OFFERS 4%

- **Assets exceed £3,250,000**
- Easy withdrawals
- Income tax borne by the society
- Any amount accepted up to £5,000
- No depreciation

INTEREST ON SHARES
FREE OF TAX
Equal to £6.19.2 per cent. gross.

For Full Particulars apply to: The Secretary,

STATE BUILDING SOCIETY
41 State House, 26 Upper Brook St., Park Lane, London, W.1
Tel.: MAYfair 8161

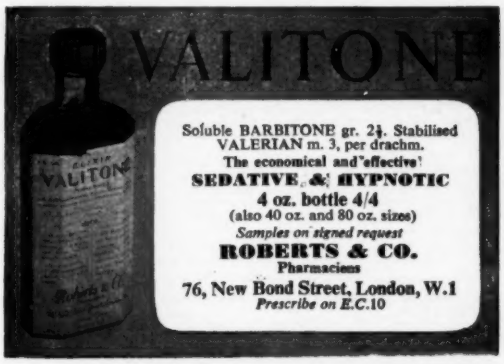
LA BOURBOULE SPA — FRANCE
Special treatment given for
ASTHMA
Respiratory & Allergic Diseases — Ear, Throat & Nose Complaints
Open MAY 20th to SEPTEMBER 30th
Full information from London Representative
4 Vernon Place W.C.1—Chancery 5688

CHISWICK HOUSE
PINNER, MIDDLESEX
Telephone: PINNER 234

Private Nursing Home for Mental and Nervous illness. All modern forms of treatment. Two country houses in adjoining grounds of 5 and 6 acres respectively, 12 miles from London. Trains every 15 minutes from Baker Street to Pinner.

DOUGLAS MACAULAY, M.D., D.P.M.

THE WORLD'S GREATEST BOOKSHOP
FOYLES
FOR BOOKS
Famed Centre For
Medical Books
Depts. for Music, Stationery, Records, Handicraft Tools and Materials, Magazine Subscriptions, Lending Library, Foreign Stamps and Coins.
119-125 CHARING CROSS ROAD LONDON WC2
Gerrard 5660 (20 lines) ★ *Open 9-6 (inc. Sats.)*
Nearest Station: Tottenham Court Road



Soluble BARBITONE gr. 2½. Stabilised VALERIAN m. 3, per drachm.
The economical and effective
SEDATIVE & HYPNOTIC
4 oz. bottle 4/4
(also 40 oz. and 80 oz. sizes)
Samples on signed request
ROBERTS & CO.
Pharmacists
76, New Bond Street, London, W.1
Prescribe on E.C.10

BOWDEN HOUSE
HARROW-ON-THE-HILL, MIDDLESEX
Established in 1911 Tel.: BYRon 1011 & 4772
(Incorporated Association not carried on for profit)
A private clinic for the treatment of the neuroses and nervous disorders by psychotherapy and all modern physical therapies.
Apply: MEDICAL DIRECTOR

HEIGHAM HALL, NORWICH
PRIVATE MENTAL HOME for Nervous and Mental illness. All types of treatment carried out. Accommodation for Alcoholics and Addicts available. Special Geriatric Unit now open. Fees from 6 gns. per week upwards according to requirements.
Apply to Dr. J. A. SMALL Telephone: Norwich 20080

SPRINGFIELD HOUSE
Near BEDFORD
Phone: BEDFORD 3417
For MENTAL CASES (including the aged)
Fees from Nine Guineas per week
For forms of admission, &c., apply to the Resident Physician, CEDRIC W. BOWER.
INTERVIEWS IN LONDON BY APPOINTMENT.

CLIFFDEN, TEIGNMOUTH
For the early treatment of nervous disorders and patients needing rest and care
A well-appointed House with spacious balconies and extensive views of the South Devon Coast. Beautiful garden and own dairy in 35 acres in the same grounds, **ROWDENS**, a comfortable house with lovely views. Private road to the beach
There is also a charming house, **EBWORTHY, MANATON, DARTMOOR**, situated in 25 acres, 1100 ft. up for bracing moorland air
Resident Physicians—BERTHA M. MULES, M.D., B.S. ANNE S. MULES, M.R.C.S., L.R.C.P. *Telephones*—TEIGNMOUTH 289 and 537

THE MEDICAL PROTECTION SOCIETY LIMITED
Over 60 years experience in medical defence and protection
Complete Indemnity granted to members in cases undertaken on their behalf
ANNUAL SUBSCRIPTION: £1 for first three years for newly qualified entrants and £2 thereafter
Full particulars from the Secretary (Dr. Alistair French), **Victory House, Leicester Sq., W.C.2.** Gerrard 4553 and 4814

ST. ANDREW'S HOSPITAL FOR NERVOUS AND MENTAL DISORDERS

NORTHAMPTON

PRESIDENT: THE EARL SPENCER

MEDICAL SUPERINTENDENT: THOMAS TENNENT, M.D., F.R.C.P., D.P.H., D.P.M.

This Registered Hospital is situated in 130 acres of park and pleasure grounds. Voluntary patients, who are suffering from incipient mental disorders or who wish to prevent recurrent attacks of mental trouble; temporary patients, and certified patients of both sexes are received for treatment. Careful clinical, biochemical, bacteriological, and pathological examinations. Private rooms with special nurses, male or female, in the Hospital or in one of the numerous villas in the grounds of the various branches can be provided.

WANTAGE HOUSE

This is a Reception Hospital in detached grounds with a separate entrance, to which patients can be admitted. It is equipped with all the apparatus for the complete investigation and treatment of Mental and Nervous Disorders by the most modern methods; insulin treatment is available for suitable cases. It contains special departments for hydrotherapy by various methods, including Turkish and Russian baths, the prolonged immersion bath, Vichy Douche, Scotch Douche, Electrical baths, Plombières treatment, etc. There is an Operating Theatre, a Dental Surgery, an X-ray Room, an Ultraviolet Apparatus, and a Department for Diathermy and High-frequency treatment. It also contains Laboratories for biochemical, bacteriological, and pathological research. Psychotherapeutic treatment is employed when indicated.

MOULTON PARK

Two miles from the Main Hospital there are several branch establishments and villas situated in a park and farm of 650 acres. Milk, meat, fruit, and vegetables are supplied to the Hospital from the farm, gardens, and orchards of Moulton Park. Occupational therapy is a feature of this branch, and patients are given every facility for occupying themselves in farming, gardening, and fruit growing.

BRYN-Y-NEUADD HALL

The seaside house of St. Andrew's Hospital is beautifully situated in a park of 330 acres, at Llanfairfechan, amidst the finest scenery in North Wales. On the North-West side of the Estate a mile of sea coast forms the boundary. Patients may visit this branch for a short seaside change or for longer periods. The Hospital has its own private bathing house on the seashore. There is trout-fishing in the park.

At all the branches of the Hospital there are cricket grounds, football and hockey grounds, lawn tennis courts (grass and hard courts), croquet grounds, golf courses, and bowling greens. Ladies and gentlemen have their own gardens, and facilities are provided for handicrafts, such as carpentry, etc.

For terms and further particulars apply to the Medical Superintendent (TELEPHONE: Northampton 4354 (3 lines)), who can be seen in London by appointment.

Vacancies

ACADEMIC AND EDUCATIONAL SECTION *Page* 48

ANÆSTHETICS
Central Middlesex, N.W.10. Reg. .. 50
Connaught, E.17. Sr. H.O. 50
Highlands Gen., N.21. H.O. 50
Hosp. for Sick Child., W.C.1. Reg. .. 52
Lambeth, S.E.11. Reg. 50
Metropolitan, E.8. Sr. H.O. 51
Middlesex, W.1. Reg. 51
St. Thomas's, S.E.1. Sr. H.O. .. 52
Whittington, N.19. Reg. 52
Ashford Middx. Reg. 53
Birmingham, Dudley Road. Sr. H.O. 53
Bristol United Hosps. & South-Western R.H.B. Reg. 53
Cardiff United Hosps. Sr. H.O.'s .. 54
Derby, Derbyshire Royal Infy. Sr. H.O. 55
Dudley, Stourbridge & Dist. Sr. H.O. 55
East Anglian R.H.B. Cons. 49
Edinburgh Northern Group of Hosps. Jr. H.M.O. 55
Hastings Group H.M.C. Sr. H.O. .. 56
Hemel Hempstead, West Herts. Locum Sr. H.M.O. 49
Luton & Dunstable. Reg. 56
Manchester, South Manchester H.M.C. Sr. H.O. 57
Mid-Kent H.M.C. Sr. H.O. 57
Nottingham City. Sr. H.O. 58
Scotland, South-Eastern R.H.B. Temp. Sr. Reg. 60
Shrewsbury, Royal Salop Infy. & Copthorne. Sr. H.O. 61
South West Met. R.H.B. Sr. H.M.O. 49
Warrington Infy. Sr. H.O. 62
Welsh R.H.B. Cons 50
Welsh R.H.B. Reg. 62

CARDIOLOGY
National Heart, W.1. Sr. H.O. or Reg. 51
St. Bartholomew's, E.C.1. P.-t. Sr. Reg. 51
Manchester United Hosps. H.O. .. 57
Newcastle Gen. H.O. 58

CASUALTY
Hackney, E.9. H.O. 50
Lambeth, S.E.11. Sr. H.O. or H.O. .. 51
London, E.1. Reg. 50
Metropolitan, E.8. Sr. H.O. 51
St. Mary's, W.2. Sr. H.O.'s 51
St. Olave's, S.E.16. Sr. H.O. 52
St. Thomas's, S.E.1. Sr. H.O. & H.O. 52
Birmingham United Hosps. Sr. H.O.'s 53
Cardiff United Hosps. Sr. H.O. .. 54
Coventry & Warwickshire. Jr. H.M.O. 54
Dudley, Stourbridge & Dist. Sr. H.O. 55
Edgware Gen. Locum Jr. H.M.O. & Sr. H.O. 55
Grimsby Gen. Sr. H.O. 56
Hemel Hempstead. West Herts. Jr. H.M.O. 56
Ilford, King George. Sr. H.O. .. 56
Ipswich & East Suffolk. Sr. H.O. .. 56
Maidenhead. H.O. 58
Maidstone. West Kent Gen. Sr. H.O. 58
Manchester. Crumpsall. Sr. H.O. .. 57
Manchester R.H.B. Sr. Casualty Officer 49
Newcastle Gen. H.O. 58
Nottingham Gen. Reg. 59
Oxford United Hosps. Reg. 59
Plymouth, South Devon & East Cornwall. Sr. H.O. 59
Salisbury Gen. Sr. H.O. 60
Shoreham-by-Sea, Sussex. Southlands. Sr. H.O. 61
Slough, Upton. Locum H.O. .. 61
Swindon Hosp. Group. Sr. H.O. .. 61
Torquay, Torbay. Sr. H.O. 62
Wrexham War Mem. Jr. H.M.O. .. 62

CHEST AND TUBERCULOSIS
Archway Group H.M.C. Reg. .. 50
Abergele Chest. H.O. 53
Cardiff, Glan Ely. Sr. H.O. 54
Chelmsford, Broomfield. Locum Sr. H.M.O. 49
Denbigh, Llangwyfan. Sr. H.O. .. 55
East Anglian R.H.B. Sr. H.M.O. .. 49
East Anglian R.H.B. Sr. Reg. .. 55
Leeds R.H.B. Locum Phys. 49
Manchester R.H.B. Reg. 57
Manchester R.H.B. Sr. H.M.O. .. 49

DERMATOLOGY
Metropolitan, E.8. P.-t. Clin. Asst. (G.P.) 51
Newcastle United Hosps. Reg. .. 58

EAR, NOSE, AND THROAT
Hosp. for Sick Child., W.C.1. Sr. Reg. 52
Bradford, Royal Eye & Ear. Sr. H.O. 53
Ipswich & East Suffolk. H.O. .. 56
Maidstone, Kent County Ophthalmic & Aural. Sr. H.O. 57
Manchester United Hosps. H.O.'s .. 57
Newcastle United Hosps. Reg. .. 58
Salisbury Gen. Sr. H.O. 60
Scotland, South-Eastern R.H.B. Sr. Reg. 60
Sheffield United Hosps. Reg. .. 60
Stoke-on-Trent, North Staffs Royal Infy. Sr. H.O. 61

GENITO-URINARY
Manchester, Crumpsall. Sr. H.O. .. 57

GERIATRICS
Newcastle Gen. H.O. 58

HÆMATOLOGY
Manchester United Hosps. H.O. .. 57

INFECTIOUS DISEASES
Bristol, Ham Green. Jr. H.M.O. .. 53
Nottingham, Heathfield. Locum Jr. H.M.O. 58

MEDICINE
Battersea Gen., S.W.11. H.O. .. 50
Lambeth, S.E.11. H.O. 51
Metropolitan, E.8. Pre-reg. H.O.'s .. 51
Mile End, E.1. H.O. 51
North West Met. R.H.B. P.-t. Cons. 49
Poplar, E.14. Sr. H.O. 51
Putney, S.W.15. H.O. 51
Royal Free Hosp. Group. Reg. .. 51
South Lodge, N.21. H.O. 51
St. Leonard's, N.1. H.O. 51
St. Mary's, W.2. Reg. 52
St. Stephen's, S.W.10. Pre-reg. H.O. 52
St. Thomas's, S.E.1. H.O. 52
Whittington, N.19. Sr. H.O. & H.O.'s 52
Woolwich Group H.M.C. H.O.'s .. 52
Bedford Gen. Pre-reg. H.O. 53
Birmingham R.H.B. Reg. 53
Brighton, New Sussex Hosp. for Women. H.O. 53
Bristol United Hosps. & South-Western R.H.B. Reg. 54
Bury St. Edmunds, West Suffolk Gen. H.O. 54
Chelmsford & Essex. H.O. 54
Chelmsford & Essex. Pre-reg. H.O. 54
Chelmsford H.M.C. Locum Reg. .. 54
Chelmsford, St. John's. H.O. .. 54
Chesterfield Royal. Sr. H.O. 55
Dorking Gen. Sr. H.O. 55
Dudley, Stourbridge & Dist. Pre-reg. H.O. 55
Epping, St. Margaret's. Pre-reg. H.O. 55
Exeter, Royal Devon & Exeter. H.O. 55
Gainsborough, John Coupland. Jr. H.M.O. 56
Hastings, Royal East Sussex. Pre-reg. H.O. 56
Hertford County. H.O. 56
Lancaster, Royal Lancaster Infy. Sr. H.O. 56
Manchester R.H.B. Reg. 57
Manchester United Hosps. H.O.'s 57
Manchester United Hosps. Sr. H.O.. 57
Newcastle Gen. H.O.'s 58
Newmarket Gen. H.O. 58
Nottingham Gen. Pre-reg. H.O.'s .. 59
Nottingham, Highbury. Sr. H.O. .. 59
Poole Gen. & Alderney Hosps. Pre-reg. H.O. 59
Portsmouth Group H.M.C. Pre-reg. H.O. 59
Portsmouth, St. Mary's. Sr. H.O. .. 59
Reading Area Dept. of Med. H.O. .. 60

Sheffield United Hosps. Sr. H.O. .. 60
South-Western R.H.B. P.-t. Clin. Assts. 61
Stoke-on-Trent. North Staffs Royal Infy. Pre-reg. H.O. 61
Taplow. Canadian Red Cross Mem. H.O. 61
Taunton & Somerset. H.O. 61
Torquay. Torbay. Pre-reg. H.O. .. 62
Waltham Abbey. Honey Lane. Locum Jr. H.M.O. 62
Winchester. Royal Hants County. Pre-reg. H.O. 62
Windsor. King Edward VII. H.O. .. 62
Wolverhampton Group. Pre-reg. H.O.'s 62
Worthing. H.O. 62
New Zealand. Taumarunui Hosp. Board. Phys. 50

NEUROSURGERY
Manchester United Hosps. H.O.'s.. 57
Newcastle Gen. Sr. H.O. 58

OBSTETRICS AND GYNÆCOLOGY
Lambeth, S.E.11. H.O. 50
Mile End, E.1. H.O.'s.. 51
North West Met. R.H.B. Reg. .. 51
St. Thomas's, S.E.1. H.O. 52
Tottenham Group H.M.C. H.O.'s .. 52
Whipps Cross, E.11. Pre-reg. H.O. .. 52
Whittington, N.19. H.O. 52
Aylesbury. Stoke Mandeville. H.O. 52
Birmingham R.H.B. Reg. 53
Bury St. Edmunds. West Suffolk Gen. H.O. 54
Canterbury. Kent & Canterbury. H.O. 54
Carluke, Lanarkshire. Law. H.O. or Locum 54
Chelmsford. St. John's. Locum Reg. 54
Edgware Gen. H.O.'s.. 55
Leeds R.H.B. Regs. 56
Manchester United Hosps. H.O.'s.. 57
Newcastle upon Tyne H.M.C. & Hexham & Dist. H.M.C. Pre-reg. H.O.'s 58
Nottingham. City. Reg. 58
Nottingham. Highbury. Sr. H.O. .. 59
Oxford. Nuffield Dept. of Obst. & Gyn. Asst. 59
Portsmouth Group H.M.C. Sr. H.O. 59
Reading Combined Hosps. H.O. .. 59
Rochford, Essex. Gen. Pre-reg. H.O. 60
Rustington, Sussex. Zachary Merton Maty. H.O. 60
Scotland. Western R.H.B. Reg. .. 60
Welsh R.H.B. Reg. 62
Wolverhampton Group. Pre-reg. H.O. 62

OPHTHALMOLOGY
Cardiff United Hosps. Sr. H.O. .. 54
Newcastle upon Tyne H.M.C. Sr. H.O. 58
Romford. Oldchurch. Sr. H.O. .. 60
Scotland. South-Eastern R.H.B. Reg. 60
Sheffield United Hosps. Reg. .. 60

ORTHOPÆDICS
Whipps Cross, E.11. Pre-reg. H.O. .. 52
Beverley. Westwood. H.O.. 53
Brighton Gen. H.O. 53
Bury St. Edmunds. West Suffolk Gen. Sr. H.O. 54
Cardiff. Prince of Wales Orthopædic. Sr. H.O. 54
Carlisle. Cumberland Infy. Sr. H.O. 54
Carluke, Lanarkshire. Law. H.O. or Locum 54
Carmarthen. West Wales Gen. Sr. H.O. 54
Doncaster Royal Infy. Reg. 55
Grimsby Gen. Sr. H.O. 56
Ipswich & East Suffolk. H.O. .. 56
Leeds R.H.B. Reg. 56
Liverpool R.H.B. Sr. H.M.O. .. 49
Manchester United Hosps. H.O.'s.. 57
Newmarket Gen. Sr. H.O. 58
Peterborough. Mem. Sr. H.O. .. 59
Portsmouth Group H.M.C. Pre-reg. H.O. 59
Rotherham. Reg. 59
Salford Royal. Sr. H.O. 60
Scotland. South-Eastern R.H.B. Reg. 60
Southend-on-Sea. Temp. Reg. .. 61
South-Western R.H.B. P.-t. Clin. Asst. 61
Stoke-on-Trent. North Staffs Royal Infy. H.O. 61
Welsh R.H.B. Reg. 62

PÆDIATRICS
St. Thomas's, S.E.1. Sr. H.O. & H.O. 52
Westminster Child's, S.W.1. Locum H.O. 52
Birmingham United Hosps. Sr. H.O. 53
Bury St. Edmunds. West Suffolk Gen. H.O. 54
Derby. Derbyshire Child's. Sr. H.O. & Pre-reg. H.O. or Sr. H.O. .. 55
Edgware Gen. Reg. 55
Hemel Hempstead, West Herts. Sr. H.O. 56
Hull A Group H.M.C. H.O. 56
Manchester. Duchess of York Hosp. for Babies. H.O. 57
Manchester United Hosps. H.O. .. 57
Middlesbrough Gen. Sr. H.O. .. 58
Newcastle Gen. H.O.'s 58
Newcastle R.H.B. Reg. & Sr. H.O.. 58
Salisbury Gen. H.O. 60
Scotland. Western R.H.B. Reg. .. 60
South-Western R.H.B. P.-t. Clin. Asst. 61
Taunton & Somerset. H.O. 61
Wolverhampton Group. Pre-reg. H.O. & Locum H.O. 62
New Zealand. Otago Hosp. Board & Univ. P.-t. Visiting Asst. Pæd. & Asst. Lect. 50

PATHOLOGY
Paddington Gen., W.9, & St. Charles', W.10. Sr. H.O.'s 51
South London Hosp for Women, S.W.4. Locum Reg. & Sr. H.O. .. 51
Beverley. Westwood. Sr. H.O. .. 53
Birmingham United Hosps. Sr. H.O. 53
Cardiff United Hosps. Sr. H.O. .. 54
Manchester R.H.B. Cons. 49
Manchester R.H.B. Reg. 57
Manchester United Hosps. Sr. H.O.'s 57
Rotherham Clinical Lab. Reg. .. 59
Scotland. Eastern R.H.B. Reg. .. 60
Sheffield United Hosps. Sr. Reg. & Sr. H.O. 60
St. John's, Newfoundland, Canada. Gen. Reg. 63

PHYSICAL MEDICINE
St. Thomas's, S.E.1. Reg. 52

PSYCHIATRY
Fountain Group H.M.C. Jr. H.M.O... 50
Guy's, S.E.1. Reg. 50
Hosp. for Sick Child., W.C.1. P.-t. M.O. 52
St. Bartholomew's, E.C.1. P.-t. Sr. Reg. 51
St. Thomas's, S.E.1. H.O. 52
Arlesey, Beds. Three Counties. Reg. 53
Birmingham R.H.B. Cons. 49
Cardiff. Whitchurch. Sr. H.O.'s .. 54
Chichester. Graylingwell H.M.C. Sr. Reg. 55
East Anglian R.H.B. Reg. 55
Epsom. The Manor. Sr. H.O. or Jr. H.M.O. 55
Hailsham. Hellingly Mental. Jr. H.M.O. 56
Leicester. Towers Mental. Jr. H.M.O. 56
Lincoln. Lawn. Jr. H.M.O. 57
Manchester R.H.B. Reg. 57
Oxford. Warneford & Park Hosps. M.C. Sr. H.O. 59
Retford, Notts. Rampton. Sr. Reg. 60
Scotland Northern R.H.B. Cons. .. 49
Sheffield R.H.B. Cons. & Sr. H.M.O. 49
South West Met. R.H.B. Locum Cons. or Sr. H.M.O. & Sr. H.M.O.'s 49/50
South West Met. R.H.B. Reg. .. 61
Sutton. Belmont. Reg. 61
Warlingham Park H.M.C. Sr. Reg... 62
Blackrock, Co. Dublin. St. Augustine's Res. Training Centre. Med. Director 50

RADIOLOGY
London, E.1. Reg. 50
South West Met. R.H.B. P.-t. Cons. 49
Birmingham R.H.B. P.-t. Cons. .. 49
Isle of Man Health Services Board. Locum Cons... 49
Scotland. North-Eastern R.H.B. Sr. Reg. 60

SURGERY
Bolingbroke, S.W.11. H.O.'s .. 50
Connaught, E.17. H.O.'s 50
Hosp. of St. John & St. Elizabeth, N.W.8. Reg... 50
Metropolitan, E.8. Pre-reg. H.O.'s.. 51
North Middlesex, N.18. H.O. .. 51
Poplar, E.14. Pre-reg. H.O. .. 51
Queen Mary's Hosp. for the East End, E.15. Pre-reg. H.O. 51
Royal Marsden, S.W.3. H.O. .. 51
St. Mary's, W.2. P.-t. Sr. H.O. .. 51
St. Mary's, W.2, & North West Met. R.H.B. Sr. Reg. 52
Whittington, N.19. H.O.'s 52
Wimbledon, S.W.20. H.O. 52
Ashford, Middx. Reg. 53
Batley. Gen. Sr. H.O. 53
Bedford Gen. H.O. 53
Birmingham Accident. H.O... .. 53
Birmingham Accident. Sr. H.O. .. 53
Birmingham R.H.B. Reg. 53
Bishop Auckland. Gen. H.O. .. 53
Bournemouth. Royal Victoria. H.O. 54
Brighton Gen. H.O. 53
Bristol. Cossham & Frenchay H.M.C. H.O. 53
Bury & Rossendale H.M.C. Pre-reg. H.O. 54
Bury St. Edmunds. West Suffolk Gen. H.O.'s.. 54
Carlisle. Cumberland Infy. H.O.'s .. 54
Carshalton. Queen Mary's Hosp. for Child. H.O. 54
Chelmsford & Essex. H.O. 54
Cheltenham Gen. H.O.'s 54
Chertsey. St. Peter's. Sr. H.O. or Pre-reg. H.O. 54
Chichester. St. Richard's. Pre-reg. H.O.'s 54
Croydon. Mayday. Pre-reg. H.O. .. 55
Derby. Derbyshire Child's. Pre-reg. H.O. or Sr. H.O. 55
Derby. Derbyshire Royal Infy. Pre-reg. H.O. or Sr. H.O. 55
Dudley, Stourbridge & Dist. Pre-reg. H.O.'s 55
Edgware Gen. H.O. 55
Enfield. Chase Farm. H.O.'s .. 55
Epping. St. Margaret's. H.O. .. 55
Epsom Dist. Pre-reg. H.O. 55
Guildford. Royal Surrey County. H.O. 56
Halifax Gen. H.O. 56
Hastings. Buchanan. Locum Sr. H.O. 56
Haverfordwest. Pembroke County War Mem. Sr. H.O. 56
Hertford County. Pre-reg. H.O. .. 56
Huntingdon County. H.O. 56
Ipswich & East Suffolk. H.O. .. 56
Leamington Spa. Warneford Gen. H.O. 57
Lincoln County. Pre-reg. H.O. .. 57
Luton & Dunstable. Locum Sr. Reg. 56
Manchester. Altrincham Gen. Sr. H.O. 57
Manchester R.H.B. Reg. 57
Manchester United Hosps. H.O.'s.. 57
Newcastle Gen. H.O.'s 58
Newmarket Gen. Sr. H.O. & H.O. .. 58
Newport, I.W. St. Mary's. Sr. H.O. or H.O. 58
Newton Abbot. Sr. H.O. 58
Nottingham Gen. Sr. H.O. & H.O.'s 59
Nuneaton. George Eliot. Pre-reg. H.O. 59
Plymouth. South Devon & East Cornwall. Sr. H.O. & Pre-reg. H.O.'s 59
Pontefract Gen. Infy. H.O. 59
Poole Gen. H.O. & Pre-reg. H.O.'s .. 59
Portsmouth Group H.M.C. Pre-reg. H.O.'s 59
Reading. Royal Berks. H.O. .. 60
Rochdale & Dist. H.M.C. H.O. .. 60
Rochford, Essex. Gen. Pre-reg. H.O. 60
Romford. Victoria. Temp. Reg. .. 60
Scotland. Western R.H.B. Regs. .. 60
Scunthorpe War Mem. Pre-reg. H.O. 60
Sidcup & Swanley H.M.C. Sr. H.O... 60
Slough. Upton. Pre-reg. H.O. .. 61
Southampton Gen. H.O.'s 61
Southampton. Royal South Hants. H.O.'s & Locum Sr. Reg. 61
Stoke-on-Trent. City Gen. Pre-reg. H.O.'s 61
Swindon & Dist. H.M.C. H.O.'s .. 61
Taunton & Somerset. H.O. 61
Torquay. Torbay. H.O. 62
Tunbridge Wells. Kent & Sussex. Pre-reg. H.O. 61
Watford Peace Mem. & Shrodells Hosps. Reg... 62
Welsh R.H.B. Locum Cons... .. 50
Welsh R.H.B. Reg. 62
Whitehaven. Cumberland. Pre-reg. H.O. or Sr. H.O. 62
Winchester. Royal Hants County. H.O. 62
Windsor. King Edward VII. H.O.'s 62
Wolverhampton Group. Pre-reg. H.O.'s & Locum H.O. 62
Worksop. Victoria. Reg. 62
Worthing. H.O. 62
Wrexham. Maelor Gen. Pre-reg. H.O. 62

THORACIC SURGERY
St. Thomas's, S.E.1. H.O. 52
Newcastle R.H.B. Reg. 58
Nottingham City. Sr. H.O. 59
Sheffield United Hosps. Reg. .. 60

GENERAL
Canada. Victoria Hosp., London, Ont. Jr. Rotating Internships 62
St. John's, Newfoundland, Canada. Gen. Internes 62
U.S.A. St. Elizabeth Hosp., Covington, Kentucky. Internes 63

PUBLIC APPOINTMENTS 63
GENERAL PRACTICE 64
NON-MEDICAL 64
MISCELLANEOUS 64

Academic and Educational

UNIVERSITY OF MANCHESTER

A COURSE in preparation for the DIPLOMA IN PSYCHOLOGICAL MEDICINE will commence in OCTOBER, 1956, subject to a sufficient number of candidates being available. The instruction is part-time covering 3 half-days per week for 8 terms.

Further particulars as to admission and fees may be obtained from the Dean of Postgraduate Medical Studies, The University, Manchester, 13, to whom applications for entry to the course should be made not later than Monday, 2nd July.

UNIVERSITY OF EDINBURGH

CHAIR OF ORTHOPÆDIC SURGERY

The University Court invites applications for appointment to the Chair of Orthopædic Surgery which will become vacant on 30TH SEPTEMBER, 1956, by the retirement of Prof. Sir WALTER MERCER.

The terms and conditions of appointment may be obtained from the undersigned, with whom applications (15 copies) giving the names of 3 referees and including any testimonials candidates may wish to offer, should be lodged not later than 15th June, 1956. A candidate from overseas may submit 1 copy of his application.

JOHN MACPHERSON, Assistant Secretary to the University.

UNIVERSITY OF EDINBURGH

WILLIAM RAMSAY HENDERSON TRUST

2 LECTURES will be delivered in the Anatomy Lecture Theatre, University New Buildings, Teviot-place, Edinburgh, on WEDNESDAY and THURSDAY, 23RD and 24TH MAY, at 5 P.M. on both days by Prof. ALF BRODAL, Professor of Anatomy, University of Oslo, Norway.

Subjects: "The Reticular Formation of the Brain Stem" and "Anatomical Aspects and Functional Correlations."

Prof. G. J. Romanes will preside.

WALLACE & GUTHRIE, W.S., Agents for the Trustees.

JOHN MACPHERSON, Assistant Secretary to the University.

THE UNIVERSITY OF LIVERPOOL

RADIOLOGY

The University of Liverpool provides a FULL-TIME COURSE of 2 academic years leading to a Diploma in Radiology which can be taken in either Radio-diagnosis or Radiotherapy (D.M.R.(D.) Liverpool or D.M.R.(T.) Liverpool), and which is open to graduates of approved medical schools. The course (which begins in OCTOBER each year) allows a candidate to hold suitable approved hospital appointments during the second year, and covers the regulations required by the Conjoint Board. The fee for the full 2-year course is £63. The degree of M.Rad. may, after report by the Faculty, be conferred on holders of the D.M.R.(D.) or (T.) Liverpool under certain conditions.

Applications for further information should be addressed to the Dean of the Faculty of Medicine.

STANLEY DUMBELL, Registrar.

GRESHAM COLLEGE

Basinghall-street, London, E.C.2 (Tel.: MONarch 2433)

4 LECTURES by Prof. J. L. D'SILVA, D.SC., M.R.C.P., (Gresham Professor in Physic) on "The Tissues and the Utilization of Oxygen," TUESDAY–FRIDAY, 22ND–25TH MAY.

The Lectures are free and begin at 5.30 P.M.

MARLBOROUGH DAY HOSPITAL

38, Marlborough-place, London, N.W.8

Medical practitioners and professional people working in the mental health field are cordially invited to LECTURES held at the above Hospital on the first Monday of every month at 8.15 P.M.

ON MONDAY, 4TH JUNE, 1956, Dr. J. C. M. MATHESON, D.S.O., Principal Medical Officer of H.M. Prison, Brixton, will be speaking on:—

"The Doctor as Expert Witness in Criminal Courts."

J. BIERER, Medical Director.

(This is the last of the present series of lectures. They will be resumed in the autumn.)

NATIONAL HEART HOSPITAL

Westmoreland-street, W.1, and BUCKINGHAM

The ST. CYRES LECTURE for 1956 will be delivered in the Barnes Hall of the Royal Society of Medicine, 1, Wimpole-street, W.1, on WEDNESDAY, 13TH JUNE, at 5 P.M., by Dr. WALLACE BRIGDEN.

Subject: "The Rarer Forms of Myocardial Disease."

Members of the Medical Profession are cordially invited.

ST. GEORGE'S HOSPITAL, Hyde Park Corner, S.W.1. Applications are invited for a Part-time (3 days a week) RESEARCH ASSISTANT IN PHYSIOLOGY to the Department of Anæsthetics for 1 year at a salary of £250 p.a. Candidates should have an appropriate University qualification.

Applications, giving details of age, qualifications and experience, should be sent to P. H. CONSTABLE, House Governor.

GUY'S HOSPITAL MEDICAL SCHOOL. Applications are invited for an appointment as JUNIOR LECTURER in the Bacteriology Department of Guy's Hospital Medical School. Applicants should have a medical qualification or an honours degree, preferably in a biological science. Salary according to qualifications and experience in the range £700–£1300 with superannuation and family allowances. Appointment will be for 1 year from 1st October, 1956, but the holder will be eligible for reappointment.

Forms of application and further particulars are obtainable from the Dean, Guy's Hospital Medical School, London Bridge, S.E.1, to whom forms of application should be forwarded not later than 26th May, 1956.

GUY'S HOSPITAL MEDICAL SCHOOL. Applications are invited for a post of RESEARCH FELLOW in the Diabetic Department; the appointment would be for a period of 1 year in the first instance at a salary of £850 or £965 p.a. according to qualifications and experience.

Forms of application are obtainable from, and should be forwarded to, the Dean, Guy's Hospital Medical School, London Bridge, S.E.1.

ST. BARTHOLOMEW'S HOSPITAL, London, E.C.1. Applications are invited from registered medical practitioners for a FELLOWSHIP of 2 years duration to investigate the epidemiology of cancer. The work will be based mainly on data derived from the National Cancer Registration Scheme and will be carried out chiefly in London, with possible visits to regional centres. Candidates should have adequate clinical training: some experience in the analysis of statistical material will prove an advantage. Salary: first year £1100 rising to £1200 with superannuation.

Applications including the names of 3 referees, should be sent to the Clerk to the Governors within 28 days of the date of this advertisement.

ST. MARY'S HOSPITAL MEDICAL SCHOOL (University OF LONDON), Paddington, W.2. Applications are invited for 3 POSTGRADUATE RESEARCH FELLOWSHIPS at the rate of £500 for 1 year, which may be held in any Pre-medical, Pre-clinical or Clinical Department of the Medical School. Applicants must be medically qualified, or hold an Honours Degree in Science, and should have completed their national service. The duties will consist of whole-time research under the Head of the Department concerned.

Applications (in duplicate), stating age, qualifications, experience, and a brief outline of the research work proposed, together with the names of 2 referees, should be received by the Secretary not later than 15th June, 1956.

ST. MARY'S HOSPITAL MEDICAL SCHOOL (University OF LONDON), Paddington, W.2. Applications are invited for the appointment of ASSISTANT LECTURER IN PHYSIOLOGY. Salary within the scale £700–£50–£900 p.a. together with superannuation and children's allowances. Science degree essential; medical qualification desirable.

Applications (2 copies), with the names of 2 referees, should be submitted by 15th June to the Secretary, from whom further particulars may be obtained.

THE UNIVERSITY OF MANCHESTER. Applications are invited from candidates with medical qualifications registrable in this country for the post of LECTURER IN ANATOMY. Good research facilities available. **Salary** on the scale £1000–£1800 p.a. with membership of F.S.S.U. and Children's Allowance Scheme: initial salary according to qualifications and experience. The successful candidate will be expected to take up his duties as soon as possible.

Applications should be sent, not later than 7th June, 1956, to the Registrar, the University, Manchester, 13, from whom further particulars and forms of application may be obtained. Overseas applicants should send letters of application giving details of qualifications and experience, and should submit the names of at least 2 persons to whom reference may be made.

UNIVERSITY OF GLASGOW. Applications are invited for a LECTURESHIP IN BACTERIOLOGY. Salary according to placement on University scale for clinical teachers. The final maximum is £1750 p.a. F.S.S.U. and family allowance benefits.

Applications (12 copies) should be lodged, not later than 9th June, 1956, with the undersigned, from whom further particulars may be obtained.

ROBT. T. HUTCHESON, Secretary of University Court.

ANATOMY DEPARTMENT, DALHOUSIE UNIVERSITY, HALIFAX, NOVA SCOTIA, CANADA. Applications are invited for an ASSISTANT PROFESSOR in the Department of Anatomy. Experience in teaching and research in embryology and histology, or in neuro-anatomy, is essential and a working knowledge of gross anatomy desirable. Candidates with a medical degree will be preferred, although those with an Honors Degree in Medical Science or Biology will receive special consideration. The minimum salary for a medical graduate will be $5000. The salary will depend on qualifications and experience.

Applications to be made to Prof. R. L. DEC. H. SAUNDERS at the above address.

SOUTH AFRICAN INSTITUTE FOR MEDICAL RESEARCH, JOHANNESBURG, SOUTH AFRICA. Applications are invited for the following positions in the Pathology Division of the Pneumoconiosis Research Unit of the Council for Scientific and Industrial Research at the South African Institute for Medical Research.

(*a*) 3 SENIOR MEDICAL OFFICERS. 2 positions are available for Medical Practitioners with experience in general pathology and in the pathology of the pneumoconioses, and 1 post for an applicant with experience in the bacteriology of chest diseases, especially tuberculosis. Salary grades will be £1450–£100–£1850 and £1850–£100–£2250, the commencing salary to be determined by experience of the applicant. In addition there is a variable cost-of-living allowance, at present approximately £280 p.a.

(*b*) BIOCHEMIST or ORGANIC CHEMIST. Salary scales £1250–£50–£1400 and £1450–£100–£1850 p.a., the commencing salary to be determined by the training and experience of the applicant. In addition a variable cost-of-living allowance is payable at present approximately £280 p.a. Applicants should have either medical qualifications or a suitable degree in chemistry.

Successful applicants will be required to join the Staff Provident Fund of the South African Institute for Medical Research, for which a certificate of good health is required. A contribution will be made to the travelling expenses of a successful overseas applicant.

Applications should reach the Director of the South African Institute for Medical Research, P.O. Box 1038, Johannesburg, South Africa, within 21 days of the appearance of this advertisement.

UNIVERSITY COLLEGE OF THE WEST INDIES. Applications are invited for SENIOR LECTURESHIP IN PREVENTIVE MEDICINE. Duties (to be assumed as soon as possible) include teaching students for medical degrees of University of London, study of medical aspects and economic conditions in West Indies and other research activities. Salary scale £1700–£100–£2400 p.a. Entry point determined by qualifications and experience. Child allowance. F.S.S.U. Unfurnished accommodation at rent 5% of basic salary, or allowance in lieu. Passages paid for up to 5 persons on appointment, normal termination and study leave (once every 3 years).

Detailed applications (10 copies), naming 3 referees, by 18th June, 1956, to Secretary, Senate Committee on Colleges Overseas in Special Relation, University of London, Senate House, London, W.C.1, from whom further particulars may be obtained.

Hospital Services : Senior Appointments

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. ROYAL LONDON HOMŒOPATHIC HOSPITAL, Great Ormond-street, W.C.1. (183 Beds.)

2 CONSULTANT HOMŒOPATHIC PHYSICIANS, each for 2 half-days a week.

Applications before 25th June, 1956.

Hospital may be visited by direct appointment.

Application forms obtainable from, and returnable to, Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires 2 Part-time CONSULTANT RADIOLOGISTS for the Fulham and Kensington Group : 1 post for 7 half-days per week with duties mainly at Fulham Hospital and 1 for 8 half-days per week with duties mainly at St. Mary Abbot's Hospital. Candidates must have D.M.R. and wide experience in radiology. Candidates for the post at St. Mary Abbot's Hospital should have special interest in gastro-enterology and pelvimetry.

Applications by letter (5 copies), giving date of birth, qualifications, experience and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 9th June, 1956. Applicants may visit hospitals by local arrangement.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

Stoke Group

Part-time CONSULTANT RADIOLOGIST. Duties at City General, Stoke-on-Trent (6 notional half-days), Leek Memorial and Moorlands (1 notional half-day), Hartshill Orthopædic (1 notional half-day), and Bucknall (1 notional half-day) hospitals. Wide experience specialty/higher qualification required.

St. Margaret's Hospital, Birmingham (1491 Beds and associated clinics)

Whole-time CONSULTANT PSYCHIATRIST/DEPUTY MEDICAL SUPERINTENDENT. Wide experience specialty/D.P.M. required. Some experience child psychiatry. All modern methods rehabilitation mental defectives practised. Married quarters.

Applications (15 copies), stating name, age, nationality, qualifications, present and previous appointments and details of 3 referees, to Secretary, 10, Augustus-road, Birmingham, 15, before 4th June, 1956.

CHELMSFORD, ESSEX. BROOMFIELD HOSPITAL. Required experienced Locum Tenens SENIOR HOSPITAL MEDICAL OFFICER (part resident). Unit has 330 Beds for the treatment of pulmonary tuberculosis in adults. Tuberculous and non-tuberculous thoracic surgery. Chest clinics and mass radiography.

Apply Physician-Superintendent.

EAST ANGLIAN REGIONAL HOSPITAL BOARD CONSULTANT ANÆSTHETIST (whole-time), South West General Hospitals Group. Main Hospital Newmarket General Hospital (330 Beds.) Wide experience in specialty and higher qualifications essential.

Applications (8 copies), stating age, experience and the names of 3 referees, to the Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 4th June, 1956. Candidates invited to visit Hospital by direct arrangement with Medical Superintendent, Newmarket General Hospital.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. ASSISTANT CHEST PHYSICIAN (whole-time), Peterborough and Huntingdon Chest Clinic Areas. Higher qualification and experience in chest diseases and tuberculosis necessary. Salary scale £1500–£1950.

Applications (8 copies), stating age, experience, and the names of 3 referees, to the Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 28th May, 1956. Candidates invited to visit Clinic by direct arrangement with Hospital Management Committee Secretary, Memorial Hospital, Peterborough.

HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL. Locum Tenens ANÆSTHETIST (Senior Hospital Medical Officer) required for whole-time duties 12th–28th June, 1956, inclusive.

Applications to the Secretary.

LIVERPOOL REGIONAL HOSPITAL BOARD. North LIVERPOOL AREA. Applications are invited for the post of Whole-time ASSISTANT ORTHOPÆDIC SURGEON (Senior Hospital Medical Officer) with duties mainly at Walton and Bootle Hospitals. The successful applicant will work under the direction of the Consultant Orthopædic Surgeons. Preference will be given to candidates possessing a higher qualification.

Forms of application from and to be returned to Dr. T. Lloyd Hughes, Senior Administrative Medical Officer, Liverpool Regional Hospital Board, 19, James-street, Liverpool, 2, to be received not later than 9th June, 1956.

VINCENT COLLINGE, Secretary to the Board.

ISLE OF MAN HEALTH SERVICES BOARD. Locum CONSULTANT RADIOLOGIST required for whole-time duties in the Isle of Man from 3rd September to 14th October, 1956. Remuneration on same terms as in England for similar locum tenens posts.

Applications, giving particulars of qualifications and experience, should be sent to the Secretary of the Board, 3, Harris-terrace, Douglas, Isle of Man, from whom further particulars may if desired be obtained.

LEEDS REGIONAL HOSPITAL BOARD requires a Whole-time Resident Locum Tenens CHEST PHYSICIAN for duties at Castle Hill Sanatorium, Cottingham, near Hull, from 1st June, 1956. Appointment will be for 3 months in the first instance. Remuneration in accordance with the terms and conditions of service of hospital medical and dental staffs.

Applications, stating age, qualifications, details of present and previous appointments with dates, together with the names and addresses of 3 referees, to the Secretary, Park-parade, Harrogate, as soon as possible.

MANCHESTER REGIONAL HOSPITAL BOARD.

(*a*) Whole-time Additional CONSULTANT PATHOLOGIST to the Blackburn and District Hospitals (laboratories at the Blackburn Royal Infirmary, Queen's Park Hospital, Blackburn, and Victoria Hospital, Accrington). Good training and experience in all branches of hospital pathology essential. 7th June, 1956.

(*b*) Whole-time NON-RESIDENT ASSISTANT CHEST PHYSICIAN (Senior Hospital Medical Officer), Manchester Chest Clinic, Baguley Hospital (Regional Thoracic Surgical Centre) and Monsall Hospital (148 chest, including non-tuberculous, beds). Wide experience in diseases of chest essential, higher qualification desirable ; appointee to live in area. 5th June, 1956.

(*c*) Whole-time NON-RESIDENT SENIOR CASUALTY OFFICER, Ashton-under-Lyne General Hospital, near Manchester (522 Beds, mainly acute). Special experience required in the treatment of orthopædic cases, fractures and trauma. Appointee will assist the Consultant Orthopædic Surgeon and also have special responsibilities in the Casualty and Traumatic (including fracture) Clinics, subject to general supervision of the Consultant. Starting salary within range of £1500–£50–£1950 (according to experience, &c.). A higher qualification desirable. Tenure of post limited to 4 years. 28th May, 1956.

Application forms from the Senior Administrative Medical Officer to the Board at Cheetwood-road, Manchester, 8, to be returned by dates stated.

SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD. Applications are invited for the post of CONSULTANT PSYCHIATRIST AND DEPUTY MEDICAL SUPERINTENDENT of Craig Dunain Hospital, Inverness (930 Beds). The post is whole-time, and suitable married quarters are available.

Schedules of application and further particulars may be obtained from the undersigned, with whom applications, including the names of 3 referees, should be lodged by Saturday, 9th June, 1956. A. M. FRASER, M.D.,

Secretary and Administrative Medical Officer.

Office of the Northern Regional Hospital Board,
Raigmore, Inverness.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time or maximum Part-time CONSULTANT CHILDREN'S PSYCHIATRIST for Barnsley, Rotherham, and the surrounding West Riding Area.

Application forms and further details from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, 10. Forms to be returned by 9th June, 1956.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time ASSISTANT PSYCHIATRIST for Rauceby Hospital, Sleaford. House available on Hospital estate. Salary scale £1500–£50–£1950.

Application forms and further details from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 9th June, 1956.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires a Whole-time ASSISTANT ANÆSTHETIST (Senior Hospital Medical Officer grade) to work under the direction of a Consultant Anæsthetist in the Portsmouth Group of hospitals. The successful candidate will be required to work at various hospitals in the Group and residence in the Portsmouth area is a condition of the appointment. Canvassing will disqualify but candidates may visit the hospitals by arrangement with Mr. E. H. Hurst, F.H.A., Group Secretary, 35, Grove-road South, Southsea.

Applications (7 copies), stating age, qualifications, experience and names and addresses of 3 referees, to the Area Secretary, Highcroft, Romsey-road, Winchester, by 12th June, 1956.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Whole-time Locum CHILD PSYCHIATRIST at St. James' Hospital, Portsmouth, from 1st July, 1956 to 31st July, 1957. Department is fully staffed with psychologists and psychiatric social workers. Remuneration : £50 per week (if Consultant grading) or 31½ guineas per week.

Apply immediately to Physician-Superintendent, St. James' Hospital, Portsmouth.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Whole-time (non-resident) ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade) for the Royal Earlswood Group of (M.D.) hospitals (1000 Beds approximately). Duties principally at Forest Hospital, Horsham. Candidates should possess D.P.M. and preferably have some experience of child psychiatry. Successful candidate required to live within reasonable distance of Forest Hospital, Horsham.

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, London, W.1, by 16th June, 1956. Applicants may visit hospitals by local arrangement.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Whole-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade) at St. Ebba's Hospital, Epsom, which is principally concerned with the treatment of voluntary cases of good prognosis. The Hospital has teaching linkages with 2 London training hospitals, and has a special unit for juvenile psychotic and neurotic cases. Outpatient clinics and observation ward experience are available. The work of the successful candidate will be partly clinical and partly as Psychiatrist in charge of the E.E.G. Department in approximately equal proportions. If resident a charge of £3 6s. 6d. a week is made for full residential amenities.

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11a, Portland-place, W.1, by 16th June, 1956. Applicants may visit Hospital by local arrangement.

WELSH REGIONAL HOSPITAL BOARD. Consultant ANÆSTHETIST to serve Pontypridd and Rhondda Hospital Management Committee area. Based at East Glamorgan Hospital, Church Village, Glam. Candidate should possess F.F.A.R.C.S. Optional whole-time/maximum part-time appointment.

Applications (12 copies) to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 21 days.

WELSH REGIONAL HOSPITAL BOARD. Whole-time Locum Tenens CONSULTANT (general surgery) required Tredegar General Hospital, 29th July–1st September, 1956.

Applications, naming 2 referees, to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff.

BLACKROCK, Co. DUBLIN. ST. AUGUSTINE'S RESIDENTIAL TRAINING CENTRE AND SPECIAL SCHOOL FOR MENTALLY SUBNORMAL PATIENTS. Applications are invited for the whole-time pensionable position of MEDICAL DIRECTOR (Psychiatrist) at the above Centre and for duties at other similar Centres conducted by the Hospitaller Brothers of St. John of God. A high standard of professional qualifications and experience is required.

Application forms with particulars sent on request. Completed forms to be returned not later than 15th June, to the Rev. Brother Secretary, St. Augustine's, Obelisk-park, Blackrock, Co. Dublin.

NEW ZEALAND. TAUMARUNUI HOSPITAL BOARD. Applications are invited from medical practitioners with qualifications registrable in New Zealand, for the position of Full-time PHYSICIAN to take full charge of medical patients admitted to the Taumarunui Public Hospital. Applicants should be eligible to qualify as a Junior Specialist under the Hospital Employment (Medical Officers) Regulations, 1952. A higher medical qualification is desirable. Salary scale £1290–£1590 plus cost-of-living bonus, the commencing salary in that scale to be determined by the Medical Officers Salaries Grading Committee. Full particulars of the duties of the position and the conditions of appointment are available on request, or from the office of the High Commissioner for New Zealand, Strand, London.

Applications, showing full particulars of qualifications, and experience, together with the names of 3 referees, should be forwarded to reach the Official Secretary, the Office of the High Commissioner for New Zealand, Strand, London, W.C.2, not later than 30th June. Envelopes should be marked "Physician, Taumarunui Hospital" in the top left-hand corner.

S. A. PHILIP, Secretary.

NEW ZEALAND. THE OTAGO HOSPITAL BOARD AND UNIVERSITY OF OTAGO. VISITING ASSISTANT PÆDIATRICIAN/ASSISTANT LECTURER in Pædiatrics. Applications are invited from duly qualified medical practitioners for the position of Visiting Pædiatrician to the Otago Hospital Board and Assistant Lecturer in Pædiatrics in the University of Otago, in accordance with the conditions of appointment obtainable from THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2, from the High Commissioner for New Zealand in London, or from the Office of the Secretary. The position is a part-time one, and the holder has the right of private practice. The salary payable is in accordance with the Hospital Employment (Medical Officers) Regulations, Visiting Assistant Specialist, either £1290 plus General Wage Increase of £81 7s. p.a., or £1590 plus General Wage Increase of £81 7s. according to qualifications and experience. At the present time the salary payable will be three tenths of the full-time rate in respect of the hospital work. Additional remuneration is paid by the University in respect of lectures.

Applications, stating age, experience and qualifications, together with testimonials and Health and Radiological Certificates should be in the hands of the undersigned not later than 10 A.M. on Friday, 29th June, 1956.

W. A. WILLIAMSON, Secretary, Otago Hospital Board.
P.O. Box 946, Dunedin, New Zealand.

Hospital Services : Junior Appointments

ARCHWAY GROUP HOSPITAL MANAGEMENT COMMITTEE. REGISTRAR (whole-time) required to work at St. Pancras Chest Clinic, 26, Margaret-street, W.1, and the Tuberculosis Unit (47 Beds) at Highgate Wing of Whittington Hospital, N.19. Post vacant 8th June, 1956. Previous tuberculosis experience essential. The Clinic and Hospital may be visited by direct arrangement.

Application forms obtainable from, and returnable to, the Group Secretary, 46, Cholmeley-Park, N.6, by 28th May, 1956.

BOLINGBROKE HOSPITAL, Wandsworth Common, S.W.11. HOUSE SURGEONS (2), resident, required from 21st and 23rd May, 1956. Open to registered practitioners and pre-registration candidates.

Apply Hospital Secretary, enclosing copies of 3 recent testimonials.

BATTERSEA GENERAL HOSPITAL, Battersea Park, S.W.11. HOUSE PHYSICIAN (House Officer grade), resident, not pre-registration. Vacant early June.

Apply Hospital Secretary, enclosing copies of 2 recent testimonials.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. ANÆSTHETIC REGISTRAR required at above Hospital. Post recognised for F.F.A.R.C.S. Hospital may be visited by direct appointment.

Application forms obtainable from, and returnable to, Group Secretary, Central Middlesex Group Hospital Management Committee, Acton-lane, N.W.10, by 29th May.

CONNAUGHT HOSPITAL, Walthamstow, E.17. (118 Beds.) 2 HOUSE SURGEONS required for 6 months (General Surgery and Special Departments). Posts vacant 18th and 31st May, 1956. Recognised for F.R.C.S.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Hospital Management Committee, Forest Group, Langthorne-road, E.11.

CONNAUGHT HOSPITAL, Walthamstow, E.17. (118 Beds.) Applications are invited for the post of RESIDENT ANÆSTHETIST (graded Senior House Officer), vacant 4th July, 1956. Salary £745 p.a., less £150 p.a. for board, lodging, &c. Recognised for D.A. and F.F.A.R.C.S.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, should be sent immediately to Secretary, Hospital Management Committee, Forest Group, Langthorne-road, E.11.

FOUNTAIN GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners (Male or Female, resident or non-resident) for the appointment of JUNIOR HOSPITAL MEDICAL OFFICER (National Health Service salary scale). The Fountain Group caters for 660 mentally defective children, 80 adult female defectives and 50 blind children and provides wide experience in neurology, pædiatrics and child psychology as well as in mental deficiency. There are clinical, neuropathological and biochemical research units and clinical conferences are held weekly. Numerous lectures and demonstrations are given to students and graduates.

Applications, giving full particulars, and names of 3 referees, to Secretary, Fountain Hospital, Tooting-grove, London, S.W.17.

GUY'S HOSPITAL, S.E.1. Applications are invited for the post of REGISTRAR (first year) whole-time in the Department of Psychological Medicine. Duties to commence as soon as possible.

Forms of application are obtainable from, and should be lodged with, the Superintendent, Guy's Hospital, S.E.1, not later than 1st June, 1956.

HACKNEY HOSPITAL, London, E.9. (General—841 Beds.) Applications from registered practitioners for the 6 months resident appointment of CASUALTY OFFICER AND E.N.T. HOUSE SURGEON (House Officer grade), should be sent immediately to Secretary, above address, quoting HH/CHO.

HIGHLANDS GENERAL HOSPITAL, Winchmore Hill, London, N.21. ANÆSTHETIST (House Officer grade), resident, vacant 3rd June. 100 active surgical and orthopædic beds, approximately 1200 operations annually.

Applications, with copies of 3 testimonials, and name and address of 1 referee, to Hospital Secretary.

HOSPITAL OF ST. JOHN AND ST. ELIZABETH, 60, Grove End-road, London, N.W.8. Required, to commence on Monday, 16th July. Full-time SURGICAL REGISTRAR (Male). The possession of the Diploma of Fellow of 1 of the Royal Colleges is desirable. Honorarium at the rate of £750 p.a. Appointment will be for a period of 12 months.

Further particulars may be obtained from the Secretary to whom applications, with names of 3 referees, should be sent on or before Thursday, 7th June, 1956.

LONDON HOSPITAL, Whitechapel, E.1. Applications are invited for the post of REGISTRAR to the Radiodiagnostic Department. A higher qualification, although desirable, is not essential.

Applications (12 copies), giving the names and addresses of 3 referees, should be received by the undersigned by 31st May, 1956.

H. BRIERLEY, House Governor.

LONDON HOSPITAL, Whitechapel, E.1. Applications are invited for the post of REGISTRAR to the Accident and Orthopædic Department. A higher qualification, although desirable, is not essential, but experience in general surgery is necessary. The appointment will be for 1 year in the first instance.

Applications (12 copies), giving the names and addresses of 3 referees, should be received by the undersigned by 31st May, 1956.

H. BRIERLEY, House Governor.

LAMBETH HOSPITAL, Kennington, S.E.11. Applications are invited from pre-registration and registered medical practitioners for the appointment of RESIDENT HOUSE SURGEON in the Obstetric and Gynæcological Department. The appointment is for 6 months from 1st July, 1956. The Hospital is recognised for the M.R.C.O.G. and D.Obst.R.C.O.G.

Application forms from the Physician-Superintendent. Stamped addressed envelope should be enclosed.

LAMBETH HOSPITAL, Brook-drive, S.E.11. South West METROPOLITAN REGIONAL HOSPITAL BOARD. ANÆSTHETIC REGISTRAR required. The D.A. is not essential, but the Hospital is recognised for both this Diploma and the F.F.A.R.C.S. Appointment is for 2 years subject to review after 12 months. Canvassing will disqualify but candidates are not precluded from visiting the Hospital.

For forms of application apply (including stamped addressed envelope) to the Secretary, Lambeth Group Hospital Management Committee, Renfrew-road, S.E.11, to whom completed forms should be returned not later than 2nd June, 1956.

LAMBETH HOSPITAL, Brook-drive, S.E.11. Applications are invited for the appointment of RESIDENT CASUALTY OFFICER as from 1st June, 1956. The post is graded as Senior House Officer or House Officer according to experience and is recognised for the F.R.C.S.

Forms of application from the Physician-Superintendent.

LAMBETH HOSPITAL, Kennington, S.E.11. Applications are invited from pre-registration and registered Medical Practitioners for the position of RESIDENT HOUSE PHYSICIAN vacant on 1st July, 1956. The successful candidate will be required to carry out a fortnight's locum duty starting on 17th June, 1956.

Application forms from the Physician-Superintendent. Stamped addressed envelope should be enclosed.

METROPOLITAN HOSPITAL, Kingsland-road, London, E.8. CLINICAL ASSISTANT (General Practitioner grade) required for Dermatology Department, 1 session per week (Wednesday morning) at present held at above Hospital.

Applications, with names of 2 referees, and details of experience, to Hospital Secretary immediately.

METROPOLITAN HOSPITAL, Kingsland-road, London, E.8. (General—146 Beds.) Applications are invited from registered medical practitioners for the post of RESIDENT SENIOR HOUSE OFFICER (anæsthetist), vacant 11th July, 1956.

Applications, stating age, nationality, qualifications and experience, together with 3 testimonials, to the Hospital Secretary by 14th June, 1956.

METROPOLITAN HOSPITAL, Kingsland-road, London, E.8. (General—146 Beds.) Applications are invited from registered medical practitioners for the post of RESIDENT SENIOR HOUSE OFFICER (casualty), vacant 5th August, 1956. Post recognised for F.R.C.S.

Applications, stating age, nationality, qualifications and experience, together with 3 testimonials, to the Hospital Secretary, by 14th June, 1956.

METROPOLITAN HOSPITAL, Kingsland-road, London, E.8. (General—146 Beds.) Applications are invited for the pre-registration posts of 2 HOUSE PHYSICIANS and 3 HOUSE SURGEONS, vacant 1st July, 1956.

Applications, stating age, nationality, qualifications or probable date of qualifications and experience, with copies of 3 recent testimonials, to the Hospital Secretary by 14th June, 1956.

MIDDLESEX HOSPITAL, W.1. Applications invited for post of ANÆSTHETIC REGISTRAR.

Rules and application form, obtainable from Deputy Superintendent, should be returned, naming 2 referees, by 9th June.

MILE END HOSPITAL, Bancroft-road, London, E.1. Applications are invited for 2 posts of HOUSE SURGEON (second or third posts). Obstetrics/Gynæcology. Posts recognised in obstetrics for M.R.C.O.G. Vacancy (*a*) 7th June, 1956, (*b*) 1st September, 1956.

Application forms, obtainable from Physician-Superintendent, to be returned by 25th May, 1956, with copies of not more than 3 testimonials.

MILE END HOSPITAL, Bancroft-road, London, E.1. (484 Beds.) HOUSE PHYSICIAN (pre- or post-registration) post vacant 18th June, 1956.

Application forms, obtainable from the Physician-Superintendent, should be returned by 4th June, 1956, with copies of not more than 3 testimonials.

NATIONAL HEART HOSPITAL, Westmoreland-street, London, W.1 (with which is associated the Institute of Cardiology) Applications are invited for the post of RESIDENT MEDICAL OFFICER (Male). The appointment is for a period of 6 months from 1st July, 1956, but may be renewed for a further period not exceeding 6 months. The status and salary are either that of a Senior House Officer or Registrar and are in accordance with the national terms and conditions of service.

Applications, with copies of 3 recent testimonials, should be sent to me not later than Friday, 25th May, 1956.

ROBERT G. E. WHITNEY, Secretary to the Board.

NORTH MIDDLESEX HOSPITAL, Edmonton, N.18. Applications are invited from pre-registration and registered medical practitioners for the post of RESIDENT HOUSE SURGEON (general, with some genito-urinary, surgery). 6 months appointment, vacant 1st July, 1956. Recognised for F.R.C.S. (Eng.).

Applications, stating age, nationality, qualifications, experience, with copies of recent testimonials, to Secretary of Hospital, by 28th May.

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR in Obstetrics and Gynæcology is required for 2 years at the Luton Maternity Hospital and Luton and Dunstable Hospital, Luton, and at the Hammersmith Hospital and Institute of Obstetrics and Gynæcology. The first year to be spent at Luton and the second at Hammersmith. The post is recognised for the M.R.C.O.G., but preference may be given to a candidate with higher qualifications. Post vacant from 1st July, 1956. Hospitals may be visited by direct appointment.

Application forms obtainable from, and returnable to, the Secretary, Luton and Hitchin Group Hospital Management Committee, St. Mary's Hospital, Luton, Beds, by 29th May, 1956.

PADDINGTON GENERAL HOSPITAL, Harrow-road, W.9 (582 Beds); ST. CHARLES' HOSPITAL, Ladbroke-grove, W.10 (581 Beds). Applications are invited for the posts of 2 RESIDENT PATHOLOGISTS (Senior House Officer). Appointment will be for 1 year of which 6 months will be spent at each hospital. Further details obtainable from Director, Paddington General Hospital and Group Laboratory.

Applications, stating age, qualifications and experience, together with names and addresses of 2 referees, to Secretary to Committee, Paddington Group Hospital Management Committee, Harrow-road, W.9, by 31st May,

POPLAR HOSPITAL, East India Dock-road, E.14. House PHYSICIAN (Senior House Officer grade) required at above Hospital. Duties include inpatient, outpatient and casualty work. Post vacant 1st June, 1956.

Applications, stating age, qualifications and nationality, to Group Secretary, Bow Group Hospital Management Committee, 2A, Bow-road, E.3.

POPLAR HOSPITAL, East India Dock-road, E.14. (120 Beds.) Required, HOUSE SURGEON (pre-registration post). Duties include inpatient, outpatient and casualty work. Recognised for F.R.C.S. Vacant 1st June, 1956.

Applications, stating age, nationality and qualifications, to the Hospital Secretary.

PUTNEY HOSPITAL, Lower Common, S.W.15. House PHYSICIAN (resident), Male or Female, vacant 4th June, 1956. Open to pre-registration candidates.

Apply Hospital Secretary not later than 23rd May, 1956, enclosing copies of 3 recent testimonials.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, London, E.15. HOUSE SURGEON (pre-registration) for 6 months commencing as soon as possible.

Applications, with copies of recent testimonials, to Group Secretary, West Ham Group Hospital Management Committee, Stratford, E.15, by 29th May, 1956.

ROYAL FREE HOSPITAL GROUP. Applications are invited for the post of MEDICAL REGISTRAR at the Royal Free Hospital. Candidates should be Members of the Royal College of Physicians. Terms and conditions of service in accordance with the scale laid down by the Ministry of Health for Registrars. The appointment is for 1 year in the first instance, duties to commence 1st August, 1956.

Formal application, giving details of experience, &c., together with the names of 3 referees, should be sent to the Secretary to the Board of Governors, The Royal Free Hospital, Gray's Inn-road, W.C.1, not later than 23rd June, 1956.

ROYAL MARSDEN HOSPITAL, Fulham-road, London, S.W.3. Applications are invited from registered medical practitioners for the post of HOUSE SURGEON (resident) to commence duty on 13th July, 1956. Salary £525 p.a. The post is tenable for 6 months.

Forms of application are obtainable from the House Governor, to whom applications, together with copies of 3 recent testimonials, should be sent not later than 11th June, 1956.

SOUTH LODGE HOSPITAL, Winchmore Hill, London, N.21. RESIDENT HOUSE OFFICER required (first, second, or third post—not pre-registration). General duties as directed by the Medical Superintendent. Vacant now.

Applications, with names and addresses of 2 referees, to the Group Secretary, Enfield Group Hospital Management Committee, Chase Farm Hospital, The Ridgeway, Enfield, Middlesex.

SOUTH LONDON HOSPITAL FOR WOMEN, Clapham Common, S.W.4. Locum REGISTRAR required for the Pathological Department, also SENIOR HOUSE OFFICER.

Apply (Women candidates only) to the Secretary.

ST. BARTHOLOMEW'S HOSPITAL, E.C.1. Applications are invited for the post of ASSOCIATE CHIEF ASSISTANT in Psychological Medicine. The appointment is part-time and covers 1½ sessions per week. Candidates are required to be experienced in psychotherapy as well as in general clinical psychiatry. The appointment will be of Senior Registrar status.

Applications, together with the names of 3 referees, should be submitted to the undersigned within the next 14 days.

C. C. CARUS-WILSON, Clerk to the Governors.

ST. BARTHOLOMEW'S HOSPITAL, E.C.1. Applications are invited for the post of Part-time SENIOR REGISTRAR in the Cardiological Department for 9 sessions a week. The post is tenable from 1st July, 1956, and candidates should have completed at least 3 years as a Senior Registrar in General Medicine or Cardiology. The appointment is for 4 years, subject to annual re-election.

Applications with the names of 3 referees, should be submitted to the undersigned within the next 14 days.

C. C. CARUS-WILSON, Clerk to the Governors.

ST. LEONARD'S HOSPITAL, Nuttall-street, London, N.1. (Acute General—192 Beds.) Applications are invited from registered or provisionally registered practitioners for the post of HOUSE PHYSICIAN for 6 months commencing 15th June, 1956.

Applications, with 2 testimonials, to Hospital Secretary by 2nd June, 1956.

ST. MARY'S HOSPITAL, W.2. Applications are invited from suitably qualified practitioners for the posts of CASUALTY SURGEON (2 vacancies). Candidates must have held an appointment as House Surgeon at this Hospital or at another hospital approved by the Board of Governors. The appointments are for a first period of 6 months, with effect from 1st July, 1956. Remuneration at Senior House Officer rates.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, details and National Health Service gradings of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, not later than 5th June, 1956.

ST. MARY'S HOSPITAL, W.2. Applications are invited for the post of Part-time OUTPATIENT SURGICAL ASSISTANT for 3 notional half-days per week (Wednesday, A.M., Friday, P.M., and Saturday, A.M.), graded Senior House Officer. This appointment is designed for men or women who have already passed their Primary F.R.C.S., and is ideally suited to those reading for the Final as a large number of clinical cases are available; it will be for a first period of 12 months as from a date to be arranged.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, details and National Health Service gradings of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, not later than 30th May, 1956.

ST. MARY'S HOSPITAL, W.2. Applications are invited from suitably qualified practitioners for the post of non-resident Whole-time REGISTRAR in General Medicine. The successful applicant will be required to undertake work in the Casualty and Outpatient Departments as well as having certain inpatient duties. The appointment will be for a first period of 12 months as from 26th June, 1956.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, details and National Health Service gradings of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, not later than 5th June, 1956.

ST. MARY'S HOSPITAL, Paddington, W.2, and THE NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD SENIOR REGISTRAR in General Surgery required on 1st September, 1956, for a combined appointment. The first and final years at St. Mary's Hospital and the intervening years at either Ashford, Paddington or West Middlesex Hospitals. Possession of higher surgical qualification essential. Hospitals may be visited by direct appointment.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, details and National Health Service gradings of previous and present appointments, together with names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, not later than 30th May, 1956.

ST. OLAVE'S HOSPITAL, Lower-road, Rotherhithe, S.E.16. BERMONDSEY AND SOUTHWARK HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (casualty) required at above Hospital. Salary £745 p.a., post recognised for F.R.C.S. Appointment initially for a period of 6 months from 1st June, 1956, and is renewable.

Applications, together with full details and names of 2 referees, to the Secretary at the above address, not later than 26th May, 1956.

ST. STEPHEN'S HOSPITAL, Chelsea, S.W.10. House PHYSICIAN (resident), pre-registration. General medicine and some tuberculosis. Vacancy mid-June.

Applications, naming 2 referees, to Medical Superintendent.

ST. THOMAS'S HOSPITAL, London, S.E.1. Senior HOUSE OFFICER to the Children's Department for a period of 1 year from 28th August, 1956. Non-resident.

Applications, naming 2 referees, to the Clerk of the Governors by 2nd June, 1956.

ST. THOMAS'S HOSPITAL, London, S.E.1. House PHYSICIAN to the Children's Department for a period of 6 months from 14th August, 1956. Resident.

Applications, from fully registered medical practitioners only, to the Clerk of the Governors by 2nd June, 1956, naming 2 referees.

ST. THOMAS'S HOSPITAL, London, S.E.1. Senior RESIDENT ANÆSTHETIST (Senior House Officer grade) for a period of 6 months from 14th August, 1956, renewable for a further 6 months.

Applications, naming 2 referees, to the Clerk of the Governors by 2nd June, 1956.

ST. THOMAS'S HOSPITAL, London, S.E.1. Senior MEDICAL CASUALTY OFFICER AND RESIDENT PATHOLOGIST (Senior House Officer grade) for a period of 6 months from 14th August, 1956.

Applications, naming 2 referees, to the Clerk of the Governors by 2nd June, 1956.

ST. THOMAS'S HOSPITAL, London, S.E.1. Senior SURGICAL CASUALTY OFFICER (House Officer grade) for a period of 6 months from 14th August, 1956. Resident.

Applications, from fully registered medical practitioners only, to the Clerk of the Governors by 2nd June, 1956, naming 2 referees.

ST. THOMAS'S HOSPITAL, London, S.E.1. House PHYSICIAN to the Departments of Neurology and Thoracic Medicine, for a period of 6 months from 14th August, 1956. Resident.

Applications, from fully registered medical practitioners only, to the Clerk of the Governors by 2nd June, 1956, naming 2 referees.

ST. THOMAS'S HOSPITAL, London, S.E.1. Obstetric HOUSE PHYSICIAN at the General Lying-in Hospital, York-road, S.E.1, for 6 months from 4th September, 1956. Resident. Approved service for M.R.C.O.G.

Applications, from fully registered medical practitioners only, to the Clerk of the Governors, by 2nd June, 1956, naming 2 referees.

ST. THOMAS'S HOSPITAL, London, S.E.1. House PHYSICIAN (Department of Psychological Medicine), for a period of 6 months from 14th August, 1956. Resident.

Applications, from fully registered medical practitioners only, to the Clerk of the Governors by 2nd June, 1956, naming 2 referees.

ST. THOMAS'S HOSPITAL, London, S.E.1. Registrar to the Physical Medicine Department, whole-time, for a period of 1 year in the first instance.

Applications, naming 2 referees, to the Clerk of the Governors by 2nd June, 1956.

ST. THOMAS'S HOSPITAL, London, S.E.1. House SURGEON (Thoracic Surgical Unit), for a period of 6 months from 14th August, 1956. Resident.

Applications, from fully registered medical practitioners only, to the Clerk of the Governors by 2nd June, 1956, naming 2 referees.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There is a vacancy for a RESIDENT ANÆSTHETIST (Registrar grade) for duty primarily at the Country Branch Hospital, Tadworth, Surrey.

Full particulars and form of application, which must be returned not later than 18th June, 1956, are obtainable from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. Applications are invited for the post of Whole-time SENIOR REGISTRAR to the E.N.T. Department, falling vacant on 1st November, 1956.

Further particulars and form of application, which must be returned not later than 18th June, 1956, are obtainable from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. Applications are invited for the appointment of Part-time MEDICAL OFFICER to the Department of Psychological Medicine. Candidates should hold the D.P.M., and previous training in child psychiatry is essential. Duties will include diagnosis and treatment of children referred from the Outpatient Department. Up to 6 sessions per week, which must include attendances on Monday and Friday mornings, will be required, but consideration would be given to those who could attend only 2 of these sessions. £175 p.a. per session.

Forms of application, which must be returned by 18th June, 1956, and further particulars may be obtained from the undersigned. H. F. RUTHERFORD, House Governor and Secretary.

TOTTENHAM GROUP HOSPITAL MANAGEMENT COMMITTEE, The Green, London, N.15. RESIDENT OBSTETRIC HOUSE OFFICERS (third post) required at Bearsted Memorial Hospital (Jewish Maternity Hospital), Lordship-road, N.16, and at The Green, Hampton Court, for 6-month posts commencing 1st July, 1956. Both posts recognised for the D.Obst.R.C.O.G. Previous obstetric experience an advantage.

Application forms from the Secretary, to be returned by 2nd June, 1956.

WESTMINSTER CHILDREN'S HOSPITAL. Westminster HOSPITAL TEACHING GROUP. HOUSE PHYSICIAN required as Locum, 1st June–31st July, 1956.

Apply immediately, with copies of recent testimonials, to the Secretary, Westminster Children's Hospital, Vincent-square, S.W.1.

WHIPPS CROSS HOSPITAL, London, E.11. Applications are invited for the post of HOUSE SURGEON (pre-registration) in the Orthopædic Department. Post recognised for the F.R.C.S. and vacant early June.

Application forms from the Hospital Secretary to be returned by 28th May, 1956.

WHIPPS CROSS HOSPITAL, London, E.11. Applications are invited for the post of HOUSE SURGEON (pre-registration) in the Gynæcology and Urology Departments. Post vacant early June.

Application forms from the Hospital Secretary to be returned by 28th May, 1956.

WHITTINGTON HOSPITAL, London, N.19. Applications are invited for 3 posts of HOUSE SURGEON (general surgery), vacant 1st July, 1956. Posts are recognised for F.R.C.S. (Eng.). Pre-registration candidates may apply.

Application forms obtainable from the Group Secretary, 46, Cholmeley-park, Highgate, London, N.6 (ARChway 3070, Ext. 24), and returnable to the Medical Superintendent, Whittington Hospital, London, N.19, by 28th May, 1956.

WHITTINGTON HOSPITAL, London, N.19. (1073 Beds.) ANÆSTHETIC REGISTRAR required at above Hospital. Post recognised for F.F.A.R.C.S. and D.A. Hospital may be visited by direct appointment.

Application forms obtainable from, and returnable to, the Secretary, Archway Group Hospital Management Committee, 46, Cholmeley-park, N.6, by 28th May, 1956.

WHITTINGTON HOSPITAL, London, N.19. Applications are invited for 5 posts of HOUSE PHYSICIAN (general medicine) vacant 1st July, 1956. Posts recognised for M.D. (Lond.). Pre-registration candidates who have held a first appointment may apply.

Application forms obtainable from the Group Secretary, 46, Cholmeley-park, Highgate, London, N.6 (ARChway 3070, Ext. 24), and returnable to the Medical Superintendent, Whittington Hospital, London, N.19, by 28th May, 1956.

WHITTINGTON HOSPITAL, London, N.19. Applications are invited for the post-registration post of HOUSE SURGEON (obstetrics), vacant 1st July, 1956. Post recognised for M.R.C.O.G. in Obstetrics.

Application forms obtainable from the Group Secretary, 46, Cholmeley-park, Highgate, London, N.6 (ARChway 3070, Ext. 24), and returnable to the Medical Superintendent, Whittington Hospital, London, N.19, by 28th May, 1956.

WHITTINGTON HOSPITAL, London, N.19. Applications are invited for the post of SENIOR HOUSE OFFICER (general medicine), vacant 1st July, 1956. Post recognised for M.D. (Lond.).

Application forms obtainable from the Group Secretary, 46, Cholmeley-park, Highgate, London, N.6 (ARChway 3070, Ext. 24), and returnable to the Medical Superintendent, Whittington Hospital, London, N.19, by 28th May, 1956.

WIMBLEDON HOSPITAL, Thurstan-road, Copse Hill, S.W.20. RESIDENT HOUSE SURGEON (not pre-registration). New post. Salary £525 p.a.

Applications, giving names of 2 referees, to Secretary at above address.

WOOLWICH GROUP HOSPITAL MANAGEMENT COM-MITTEE. HOUSE PHYSICIANS. 4 posts vacant in July—3 at Brook General Hospital, Woolwich, 1 at St. Nicholas Hospital, Plumstead. All posts approved for Pre-registration Service.

Applications to Group Secretary, Memorial Hospital, Woolwich, S.E.18, not later than 2nd June.

AYLESBURY, BUCKINGHAMSHIRE. STOKE MANDE-VILLE HOSPITAL. HOUSE SURGEON for Gynæcology Department. Post recognised for M.R.C.O.G., vacant 2nd June, 1956.

Applications from registered practitioners, with 2 testimonials, to the Administrative Officer as soon as possible.

ABERGELE CHEST HOSPITAL, Abergele. (248 Beds— 69 adult pulmonary, 179 children, pulmonary and non-pulmonary. Hospital contains a major Thoracic Surgery Unit.) HOUSE OFFICER (Male or Female) required at the above Hospital.

Applications to be sent to Group Secretary, Clwyd and Deeside Hospital Management Committee, "Rhianfa," Russell-road, Rhyl, within 10 days of publication of this advertisement.

ARLESEY, BEDFORDSHIRE. THREE COUNTIES HOSPITAL (MENTAL). (1300 Beds.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR in Psychiatry (resident or non-resident) required at above Hospital. All forms of treatment carried out and outpatient clinics held at the local General Hospitals. Facilities for research work and for attendance at D.P.M. and other courses in London. Hospital may be visited by direct appointment.

Application forms obtainable from, and returnable to, the Acting Medical Superintendent, Three Counties Hospital, Arlesey, Beds, by 29th May, 1956.

ASHFORD HOSPITAL, Ashford, Middlesex. North West METROPOLITAN REGIONAL HOSPITAL BOARD. SURGICAL REGISTRAR for general surgery required. Post vacant 11th August. Hospital may be visited by direct appointment with the Medical Director.

Application forms obtainable from, and returnable to, the Secretary, Staines Group Hospital Management Committee, Ashford Hospital, Ashford, Middlesex, by 29th May, 1956.

ASHFORD HOSPITAL, Ashford, Middlesex. (560 Beds with all the usual special departments.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. ANÆSTHETIC REGISTRAR required at above Hospital for general anæsthetic duties at Ashford and such other hospitals within the Group as may be necessary. Post recognised for D.A. and F.F.A.R.C.S., vacant 7th September, 1956. Hospital may be visited by direct appointment with the Medical Director.

Application forms obtainable from, and returnable to, the Secretary, Staines Group Hospital Management Committee, Ashford Hospital, Ashford, Middlesex, by 29th May, 1956.

BATLEY. THE GENERAL HOSPITAL, Carlinghow Hill, BATLEY. Applications are invited for the post of SENIOR HOUSE OFFICER (resident) which is available immediately. The Hospital has 99 Beds which are allocated to the specialties of general surgery, E.N.T. orthopædics and ophthalmology.

Apply in writing to the Administrative Officer, enclosing copies of 2 testimonials.

BEDFORD GENERAL HOSPITAL. (437 Beds.) Resident Pre-registration HOUSE PHYSICIAN required approximately mid-June.

Applications, stating age, qualifications, experience, copies of 2 recent testimonials, to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

BEDFORD GENERAL HOSPITAL. (437 Beds.) House SURGEON required. The appointment offers exceptional opportunities for general experience in busy acute surgical units.

Applications, stating age, experience, nationality, copies of 2 recent testimonials, to Group Secretary, 3, Kimbolton-road, Bedford.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. (229 Beds.) ORTHOPÆDIC HOUSE SURGEON (first, second, or third post). Married accommodation available. Offers good opportunity for general experience in busy acute general hospital. Approved pre-registration post. Fully qualified practitioners may apply. Recognised for F.R.C.S. Vacant now.

Apply to Group Secretary.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. ASSISTANT PATHOLOGIST (Senior House Officer grade) required in Area Laboratory with attendance at Branch Laboratory, Driffield. Offers experience all branches of pathology. Salary £745.

Detailed applications to Group Secretary.

BIRMINGHAM ACCIDENT HOSPITAL. (215 Beds and 8 House Surgeons.) HOUSE SURGEON (resident), vacant 9th June. Recognised for purpose of casualty by R.C.S. (Eng.). Teaching programme by Consultant staff. Appointment for 6 months, some of which may be spent, at applicant's request, in 42-Bedded Medical Research Council's Burns Unit.

Apply by 25th May, 1956, to Administrator, naming 2 referees.

BIRMINGHAM ACCIDENT HOSPITAL, Birmingham, 15. (215 Beds.) RESIDENT SURGICAL OFFICER (Senior House Officer), vacant July. Hospital has largest Traumatic Unit in country and treats over 50,000 new patients each year. Post recognised for F.R.C.S. and offers opportunity for practical experience in management of all types of injury and teaching by Consultant staff. Residential charge £140 p.a.

Apply Administrator, naming 2 referees, by 25th May, 1956.

BIRMINGHAM, 18. DUDLEY ROAD HOSPITAL. (780 Beds.) SENIOR HOUSE OFFICER (anæsthetics) resident, required immediately. Recognised for D.A. and F.F.A.R.C.S. Extensive experience in anæsthetics not necessary. Duties include list and emergency work in general surgery, gynæcology, obstetrics, and E.N.T. at hospitals in Group.

Detailed applications, with copies of 3 recent testimonials, to Group Secretary.

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS. THE CHILDREN'S HOSPITAL, Ladywood-road, BIRMINGHAM, 16. Applications are invited for the post of ASSISTANT RESIDENT MEDICAL OFFICER (Senior House Officer), vacant 20th June, 1956, for 1 year. Main duty to take charge of Infants Block (60 Cots). Previous hospital experience of diseases of infancy is desirable and preference will be given to candidates holding the M.R.C.P.

Forms of application may be obtained from the House Governor and should be returned by 30th May, 1956.

G. A. PHALP, Secretary to the Board of Governors.

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS. THE QUEEN ELIZABETH HOSPITAL. Applications are invited for the post of CLINICAL PATHOLOGIST (Senior House Officer) in the Department of Clinical Pathology. This officer will act as 1 of 4 blood bank officers in addition to routine work in the department, and will be required to undertake his/her turn in residential duties. Previous experience in clinical pathology is not essential but applicants should have had hospital postgraduate experience. The appointment is tenable for 1 year.

Application forms may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, and should be returned to him as soon as possible.

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS. Applications are invited for the 2 posts of NON-RESIDENT SENIOR HOUSE OFFICER for duty in the Casualty Department at the General Hospital, Birmingham. The posts are tenable for 1 year.

Forms of application may be obtained from, and should be returned as soon as possible to, the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Edgbaston, Birmingham, 15.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

(1) **Dudley and Stourbridge Group, Guest Hospital, Dudley**

REGISTRAR (general medicine). Duties at Wordsley Hospital (478 Beds). Experience specialty essential; higher qualification desirable. Resident.

(2) **Shrewsbury Group, Royal Salop Infirmary, Shrewsbury**

REGISTRAR (obstetrics and gynæcology) for Royal Salop Infirmary/Copthorne Hospital. Recognised for M.R.C.O.G. (Gynæcology). Duties include teaching and considerable clinical responsibility.

(3) **Stafford Group, 13, Foregate-street, Stafford**

REGISTRAR (surgery), resident. Duties mainly at Staffordshire General Infirmary (175 Beds) and Yarnfield Recovery Unit (32 Beds). Recognised for F.R.C.S. Experience surgery essential, higher qualification desirable.

Application forms from Group Secretaries, to be returned before 28th May, 1956.

BISHOP AUCKLAND. THE GENERAL HOSPITAL. (350 Beds.) HOUSE SURGEON required. Recognised pre-registration post. Immediate vacancy.

Apply, naming 2 referees, to Group Secretary, South West Durham Hospital Management Committee, at above address.

BRADFORD, YORKSHIRE. ROYAL EYE AND EAR HOSPITAL. (105 Beds.) SENIOR HOUSE OFFICER required for E.N.T. Department of 56 Beds. Recognised for D.L.O. and F.R.C.S. Salary £745 p.a., less £150 p.a. residential emoluments.

Applications, stating age, nationality, qualifications and experience with copy testimonials, to Secretary, Bradford Royal Infirmary.

BRIGHTON. NEW SUSSEX HOSPITAL FOR WOMEN, Windlesham-road, BRIGHTON. HOUSE PHYSICIAN (Female), 6 months. Includes duties in Gynæcological Department. Open to pre-registration candidates.

Applications, stating age, nationality, qualifications and experience, with copies of 3 testimonials and/or names of referees, to Administrative Officer as soon as possible.

BRIGHTON GENERAL HOSPITAL. House Surgeon (orthopædics). Recognised as a pre-registration appointment.

Applications, stating age, qualifications, and experience, together with copies of recent testimonials, should be sent to the Physician-Superintendent, Brighton General Hospital, Elmgrove, Brighton.

BRIGHTON GENERAL HOSPITAL. House Surgeon to the General Surgical Unit (60 Beds). The post is recognised as a pre-registration appointment, and becomes vacant on 17th June.

Applications, stating age, qualifications, experience, and giving the names of 2 referees, should be sent to the Physician-Superintendent, Brighton General Hospital, Elm-grove, Brighton, 7.8

BRISTOL (near). HAM GREEN HOSPITAL, Pill, BRISTOL. Applications are invited for the post of RESIDENT ASSISTANT PHYSICIAN in the Infectious Diseases Department (350 Beds) of this Hospital. The Hospital contains a major Poliomyelitis Unit, a tuberculous meningitis treatment centre, and offers wide experience in acute medicine. Salary and conditions on Junior Hospital Medical Officer scale. House available.

Applications, stating age, qualifications, &c., to the Group Secretary, Ham Green Hospital, Pill, near Bristol.

BRISTOL. COSSHAM AND FRENCHAY HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON in General Surgery required at Cossham Memorial Hospital, Kingswood, Bristol, now until 31st July, 1956. 88 Beds acute medicine and surgery. Recognised pre-registration post but fully registered practitioners considered.

Apply to Group Secretary, Frenchay Hospital, Bristol, quoting qualifications, experience and names of 2 referees.

BRISTOL. THE BOARD OF GOVERNORS OF THE UNITED BRISTOL HOSPITALS AND THE SOUTH-WESTERN REGIONAL HOSPITAL BOARD. Applications are invited by the above Boards from registered medical practitioners for the joint appointment of REGISTRAR in Anæsthetics. This post becomes vacant on 19th July, 1956. The appointment will be held for 1 year in the first instance, and be renewable for a further year. The successful candidate will be appointed to work for the first year in the Bath Group of hospitals. The post is recognised for the F.F.A.R.C.S. and the D.A.

Applications, stating date of birth, qualifications, and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 31st May, 1956.

BRISTOL. THE BOARD OF GOVERNORS OF THE UNITED BRISTOL HOSPITALS AND THE SOUTH-WESTERN REGIONAL HOSPITAL BOARD. Applications are invited by the above Boards from registered medical practitioners for the joint appointment of REGISTRAR in General Medicine. This post becomes vacant on 19th July, 1956. The appointment will be held for 1 year in the first instance and be renewable for a further year. The successful candidate will be appointed to work for the first year at the Gloucestershire Royal Hospital, Gloucester.

Applications, stating date of birth, qualifications and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 31st May, 1956.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, Shelley-road, BOSCOMBE. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of GENERAL HOUSE SURGEON. The post, which is recognised for the F.R.C.S. examination and for pre-registration purposes, becomes vacant on 4th July, 1956.

Applications to the Hospital Secretary.

BURY ST. EDMUNDS. WEST SUFFOLK GENERAL HOSPITAL. (285 Beds.) Applications invited for the following posts:—

(*a*) SENIOR HOUSE OFFICER for orthopædic and casualty duties. Recognised for F.R.C.S. (Surgical). Vacant early July. There is also a Junior Hospital Medical Officer Casualty Officer.

(*b*) HOUSE SURGEON for general surgical and other duties, vacant late May.

(*c*) HOUSE SURGEON for general surgical duties. Recognised for F.R.C.S. Vacant early July.

(*d*) HOUSE SURGEON for obstetric and gynæcological duties. Recognised for D.Obst.R.C.O.G. Vacant early August.

(*e*) HOUSE PHYSICIAN for pædiatric and general medical duties, vacant early July.

(*f*) HOUSE PHYSICIAN for general medical duties, vacant late May.

All posts except (*a*) are recognised for pre-registration, but for post (*d*) it is considered advisable to have held 1 previous House Officer post.

Inquiries and applications, with names and addresses of 3 referees, should be sent to the Hospital Secretary.

BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE. BURY GENERAL HOSPITAL. Applications are invited for the post of HOUSE OFFICER (surgery), pre-registration.

Applications, stating age, qualifications, and names of 2 referees, should be forwarded to—

H. WILKINSON, Group Secretary.

Bury General Hospital, Bury, Lancs.

CANTERBURY. KENT AND CANTERBURY HOS-PITAL. (277 Beds.) GYNÆCOLOGICAL HOUSE SURGEON required at Highland Court Annexe, a unit of 25 gynæcological beds situated 3 miles from the above Hospital, with all ancillary services available. Recognised for M.R.C.O.G. 6 months appointment. Post vacant early July, 1956. National Health Service salary and conditions.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CARSHALTON. QUEEN MARY'S HOSPITAL FOR CHILDREN. (A General Children's Hospital of 818 Beds.) HOUSE SURGEON (resident) required for 6 months. Applicants must have completed 12 months Pre-registration Service.

Applications, stating age, qualifications, together with 3 recent testimonials, should be submitted to the Group Secretary by 25th May, 1956.

CARDIFF. UNITED CARDIFF HOSPITALS. Llandough HOSPITAL. SENIOR HOUSE OFFICER in Pathology required, to commence duty on 1st August.

Application forms are available from the Secretary to the Board, United Cardiff Hospitals, Cardiff Royal Infirmary, and should be returned within 14 days of the appearance of this advertisement.

CARDIFF. UNITED CARDIFF HOSPITALS. Cardiff ROYAL INFIRMARY. 2 SENIOR HOUSE OFFICERS in Anæsthetics required, to commence duty on 18th July and 1st August.

Application forms are available from the Secretary to the Board, United Cardiff Hospitals, Cardiff Royal Infirmary, and should be returned within 14 days of the appearance of this advertisement.

CARDIFF. UNITED CARDIFF HOSPITALS. Cardiff ROYAL INFIRMARY. SENIOR HOUSE OFFICER (Casualty Department) required to commence duty on 1st August.

Application forms are available from the Secretary to the Board, United Cardiff Hospitals, Cardiff Royal Infirmary, and should be returned within 14 days of the appearance of this advertisement.

CARDIFF. UNITED CARDIFF HOSPITALS. Cardiff ROYAL INFIRMARY. SENIOR HOUSE OFFICER in Ophthalmology required, to commence duty on 1st August.

Application forms are available from the Secretary to the Board, United Cardiff Hospitals, Cardiff Royal Infirmary, and should be returned within 14 days of the appearance of this advertisement.

CARDIFF. GLAN ELY HOSPITAL, Fairwater, Cardiff. (240 Beds.) SENIOR HOUSE OFFICER (resident) required at above Hospital for treatment of pulmonary (Thoracic Unit) and all forms of non-pulmonary tuberculosis.

Forms of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

CARDIFF. PRINCE OF WALES ORTHOPÆDIC HOS-PITAL, RHYDLAFAR, near CARDIFF. SENIOR HOUSE OFFICER required. Regional Orthopædic Centre for South Wales area of 220 Beds increasing to 290 and branch of 70 Beds. Outpatients clinic in Cardiff. Single accommodation at Hospital at Rhydlafar.

Form of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

CARDIFF. WHITCHURCH HOSPITAL. (800 Beds.) Applications are invited for the posts of SENIOR HOUSE OFFICERS in Psychiatry (Male or Female) from practitioners who have held general house appointments. Opportunities exist for gaining experience in all branches of psychiatry. Salary according to Whitley scale, less £150 p.a. if resident.

Forms of application to be obtained from the Physician-Superintendent, to whom they should be returned together with the names of 2 referees.

CARLISLE. CUMBERLAND INFIRMARY. (335 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER in the Orthopædic and Fracture Department.

Applications, giving 2 names for reference purposes, should be sent to the Group Secretary, East Cumberland Hospital Management Committee, Cumberland Infirmary, Carlisle.

CARLISLE. CUMBERLAND INFIRMARY. (335 Beds.) There are vacancies for 2 HOUSE OFFICERS (general surgery). The posts are recognised for pre-registration purposes and for the F.R.C.S. examination.

Applications, stating age, and giving details of education, training and experience, together with the names of 2 referees, should be sent to the Group Secretary, Cumberland Infirmary, as soon as possible.

CARLUKE, LANARKSHIRE. LAW HOSPITAL. Applications are invited for the following posts:—ORTHOPÆDIC HOUSE OFFICER or LOCUM and GYNÆCOLOGICAL HOUSE OFFICER or LOCUM.

Applications, stating age, qualifications and previous experience, together with the names of 2 referees, should be submitted to the Group Medical Superintendent, Law Hospital, Carluke, as soon as possible.

CARMARTHEN. WEST WALES GENERAL HOSPITAL. (188 Beds.) WEST WALES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (orthopædic and traumatic surgery) which is now vacant. Salary and conditions of service as laid down by Ministry of Health.

Applications, stating age, qualifications, experience, nationality with names and addresses of 3 referees, to the Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

CHELMSFORD HOSPITAL MANAGEMENT COMMIT-TEE. Locum MEDICAL REGISTRAR required for period 1st–30th June.

Applications with 2 recent testimonials, to the Secretary, London-road, Chelmsford.

CHELMSFORD. ST. JOHN'S HOSPITAL. Locum REGISTRAR in Obstetrics and Gynæcology required as from 11th June, 1956, for approximately 2 months.

Applications, with full particulars, to the Group Secretary, Chelmsford Group Hospital Management Committee, Chelmsford and Essex Hospital, Chelmsford.

CHELMSFORD. ST. JOHN'S HOSPITAL. House PHYSICIAN (pre-registration, first, second, or third appointment), Male or Female, to commence as soon as possible.

Applications, stating age, nationality, qualifications, and experience, together with recent testimonials, to the Secretary, Group Hospital Management Committee, Chelmsford and Essex Hospital, London-road, Chelmsford.

CHELMSFORD AND ESSEX HOSPITAL. (162 Beds.) Applications are invited for the post of RESIDENT HOUSE PHYSICIAN (pre-registration post) to work in the general medical wards of the Hospital. Duties will commence mid-June.

Applications, together with 2 recent testimonials, to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CHELMSFORD AND ESSEX HOSPITAL. (162 Beds.) Applications invited from pre-registration candidates, or others, for the post of HOUSE SURGEON. Recognised for F.R.C.S. Tenable for 6 months from 16th June. The successful candidate will have the option of proceeding immediately to the post of HOUSE PHYSICIAN for a further period of 6 months.

Applications, together with 2 recent testimonials, to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CHELTENHAM GENERAL HOSPITAL. Required, 2 HOUSE SURGEONS (pre- or post-registration). The posts offer a wide experience in general surgery; gynæcology; orthopædic surgery; and genito-urinary surgery, and are vacant now. Both posts are recognised for the F.R.C.S. The post of house physician would probably be open to a House Surgeon on completion of the House Surgeon post.

Apply Secretary, General Hospital, Cheltenham.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL (late Botley's Park War Hospital). (430 Beds.) RESIDENT HOUSE SURGEON (Senior House Officer or Intern) required for the Gynæcological (30 Beds) and E.N.T. (16 Beds) Departments. Duties to commence immediately. Salary in accordance with terms and conditions of National Health Service.

Applications, together with names and addresses of referees, to be sent to the Physician-Superintendent, St. Peter's Hospital, Chertsey, as soon as possible.

COVENTRY AND WARWICKSHIRE HOSPITAL. (354 Beds.) CASUALTY AND ACCIDENT OFFICER (Junior Hospital Medical Officer status). Recognised F.R.C.S. Resident.

Applications to Secretary, Group 20 Hospital Management Committee, Coventry and Warwickshire Hospital, Coventry.

CHICHESTER. ST. RICHARD'S HOSPITAL. (400 Beds.) CHICHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, 2 HOUSE SURGEONS (pre-registration) for 6 months only in the first instance. Post vacant 1st July, 1956. The man or woman appointed will work primarily in the surgical wards of the Hospital. Hospital recognised for F.R.C.S.

Applications, stating age, qualifications and experience, giving names of 2 persons from whom reference may be obtained, should be sent to the Surgeon-Superintendent.

CHICHESTER, SUSSEX. GRAYLINGWELL HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of SENIOR REGISTRAR (whole-time) at the above Hospital. Applicants should have had wide psychiatric experience and possession of the D.P.M. or its equivalent is essential. The Hospital has an admission-rate of 1100 a year and there are 3 active outpatient clinics. There are Departments of Research, Neurology, Psychology and Social Service, and there is a modern Electro-encephalographic Unit.

Application forms, for which a stamped addressed envelope should be supplied, may be obtained from the Group Secretary, Graylingwell Hospital, Chichester, and 5 copies should be returned to him duly completed, not later than 14 days after the appearance of this advertisement.

CHESTERFIELD ROYAL HOSPITAL. House Physician (Senior House Officer grade) required 1st June at above Hospital for 36-Bed unit (shortly to be increased to 63 beds). Post offers good experience in acute general medicine, pædiatrics, diabetics, and dermatology. National salary and conditions.

Apply M. H. BOONE, Secretary, Chesterfield Hospital Management Committee.

CROYDON. MAYDAY HOSPITAL. (611 Beds.) House SURGEON (pre-registration) for period of 6 months commencing 5th June, 1956. Post recognised for F.R.C.S. Preference given to candidates who have held previous House Officer post.

Application forms obtainable from GEORGE A. PAINES, Group Secretary, Hospital Management Committee, General Hospital, London-road, Croydon, to be returned immediately.

DENBIGH (near). LLANGWYFAN HOSPITAL. (370 Beds. Pulmonary and non-pulmonary tuberculosis. Hospital contains a major Thoracic Surgery Unit, Genito-urinary Unit, Orthopædic Unit, and Children's Unit.) SENIOR HOUSE OFFICER (Male or Female) required at the above Hospital.

Applications to be sent forthwith to Group Secretary, Clwyd and Deeside Hospital Management Committee, "Rhianfa," Russell-road, Rhyl.

DERBY. DERBYSHIRE CHILDREN'S HOSPITAL. (86 Beds.)

(1) SENIOR HOUSE OFFICER, vacant 23rd June.
(2) HOUSE PHYSICIAN (pre-registration) or SENIOR HOUSE OFFICER, vacant 25th July.
(3) HOUSE SURGEON (pre-registration) or SENIOR HOUSE OFFICER, vacant 29th July.

All posts recognised for D.C.H. Appointments to posts (2) and (3) will only be made on the Senior House Officer grade if there are no suitable pre-registration candidates, and applicants should state the type of registration they hold.

Applications, clearly indicating post desired, together with 2 names for reference, should be sent immediately to Group Secretary, No. 1 Hospital Management Committee, Babington-lane, Derby.

DERBY. DERBYSHIRE ROYAL INFIRMARY. Senior HOUSE OFFICER (anæsthetics), vacant 12th June. Recognised for D.A.

Apply, with full details and copies of 2 recent testimonials to Secretary.

DERBY. DERBYSHIRE ROYAL INFIRMARY. House SURGEON (pre-registration) or SENIOR HOUSE OFFICER for General Surgery, now vacant.

Apply, stating full details, with copies of 2 recent testimonials, to Secretary.

DONCASTER ROYAL INFIRMARY. (330 Beds. Recognised for training for F.R.C.S. examination.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time REGISTRAR (orthopædics) required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 28th May, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

DORKING GENERAL HOSPITAL, Horsham-road, Dorking, SURREY. (252 Beds.) REDHILL GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from candidates possessing previous experience for the position of SENIOR HOUSE PHYSICIAN to the Department of Medicine. The Medical firm consists of a visiting Consultant Physician, a full-time Physician, and a Resident House Physician. Post vacant 30th July, 1956. The post offers wide experience in general medicine and gives an excellent opportunity for candidates studying for M.R.C.P. Salary £745 p.a., less £130 for emoluments.

Applications, stating age, qualifications and previous experience, should be forwarded to the Medical Superintendent, not later than 4th June.

DUDLEY, STOURBRIDGE AND DISTRICT HOSPITAL GROUP. BIRMINGHAM REGION.

The Guest Hospital, Dudley (154 Beds)
SENIOR HOUSE OFFICER (casualty). Post now vacant.
SENIOR HOUSE OFFICER (anæsthetics). Post now vacant.
HOUSE OFFICER (medical), pre-registration. Post vacant July.
HOUSE OFFICER (surgical), pre-registration. Post vacant July.

Wordsley Hospital, near Stourbridge (478 Beds)
HOUSE OFFICER (surgical), pre-registration. Post vacant July.

The Corbett Hospital, Stourbridge (114 Beds)
HOUSE OFFICER (surgical), pre-registration. Post vacant June.

Apply, Group Secretary, Guest Hospital, Dudley.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. Applications are invited from pre-registration and registered medical practitioners for the appointment of HOUSE PHYSICIAN (general medicine and pædiatrics) vacant 4th July, 1956.

Applications, with copies of 2 recent testimonials, to the Hospital Secretary by 26th May, 1956.

EAST ANGLIAN REGIONAL HOSPITAL BOARD.

SENIOR REGISTRAR in Chest Medicine, Norwich and East Norfolk areas. Main chest clinic situated in Norwich. Duties include work in associated hospitals and clinics. The post offers wide experience in chest diseases. Higher medical qualification and wide experience in chest diseases and tuberculosis desirable. Candidates invited to visit clinics by direct arrangement with Hospital Management Committee Secretary, Norfolk and Norwich Hospital, Norwich.

REGISTRAR in Psychiatry, St. Andrew's Hospital, Thorpe, Norwich (1250 Beds). Full range of modern psychiatric treatments and a number of associated general hospital outpatient clinics. Married or single quarters available. Appointment for 1 year, renewable for second year. Candidates invited to visit Hospital by direct arrangement with Medical Superintendent.

Applications (8 copies), stating age, experience and the names of 3 referees, to the Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 4th June, 1956.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. Locum CASUALTY JUNIOR HOSPITAL MEDICAL OFFICER (non-resident) required from 8th to 21st June, 1956, inclusive, and Locum CASUALTY SENIOR HOUSE OFFICER (resident) required from 8th to 25th June, 1956, at above Hospital.

Apply immediately to Medical Director (Telephone No. EDGware 2381).

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. 2 RESIDENT OBSTETRIC HOUSE SURGEONS for above Hospital. Posts vacant 12th and 18th July, 1956. 6 months appointments. Both posts recognised for M.R.C.O.G.—1 post for pre-registration purposes.

Applications, stating age, qualifications, experience, and enclosing copies of up to 3 recent testimonials, to Medical Director of Hospital by 26th May, 1956.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. RESIDENT HOUSE SURGEON (general and genito-urinary surgery) for above Hospital. Post vacant 11th July, 1956. 6 months appointment. Post recognised for F.R.C.S. and pre-registration purposes.

Applications, stating age, qualifications, experience, and enclosing copies of up to 3 recent testimonials, to Medical Director of Hospital by 26th May, 1956.

EDGWARE GENERAL HOSPITAL. (715 Beds.) North WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Whole-time NON-RESIDENT PÆDIATRIC REGISTRAR required at above Hospital. (32 pædiatric beds). Department is also responsible for the supervision of 64 Cots in Maternity Unit and 50 Cots at Bushey Maternity Hospital. Hospital may be visited by direct appointment with Medical Director.

Application forms obtainable from, and returnable to, Group Secretary, Edgware General Hospital, Edgware, Middlesex, by 26th May, 1956.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. RESIDENT HOUSE SURGEON required (third post), vacant now. Post provides experience and duties in both surgery and orthopædics. 6 months appointment. Recognised for F.R.C.S. by the Royal College of Surgeons.

Applications, with names and addresses of 2 referees, to the Group Secretary, Enfield Group Hospital Management Committee.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. ENFIELD GROUP HOSPITAL MANAGEMENT COMMITTEE. Appointment of RESIDENT HOUSE SURGEON (third post), vacant 23rd June, 1956. Post provides experience and duties in both surgery and orthopædics. 6 months appointment. Post recognised for F.R.C.S. by the Royal College of Surgeons.

Applications, with names and addresses of 2 referees, to the Secretary of the Management Committee, at Chase Farm Hospital.

EPPING. ST. MARGARET'S HOSPITAL. (485 Beds.) HOUSE PHYSICIAN (pre-registration post) to Consultant in General Medicine. Post vacant 1st July, 1956.

Applications, with copies of testimonials, including 1 from medical school, to reach the Group Secretary, Epping Group Hospital Management Committee, "Oak Cottage," The Plain, Epping, Essex, by 26th May, 1956.

EPPING. ST. MARGARET'S HOSPITAL. (485 Beds.) HOUSE SURGEON (pre- or post-registration) to very busy General Surgical Unit. Hospital within easy reach of Central London. Post vacant 1st July, 1956.

Applications, with copies of testimonials, including 1 from medical school, to reach the Group Secretary, Epping Group Hospital Management Committee, "Oak Cottage," The Plain, Epping, Essex, by 26th May, 1956.

EPSOM DISTRICT HOSPITAL, Dorking-road, Epsom, SURREY. RESIDENT HOUSE SURGEON required 1st July, for Orthopædic, E.N.T. and Eye Department. Pre-registration post.

Applications, stating age, qualifications and experience with copies of 2 recent testimonials, should be sent immediately to Group Secretary at above address.

EPSOM, SURREY. THE MANOR HOSPITAL. Applications are invited for the appointment of SENIOR HOUSE OFFICER or JUNIOR HOSPITAL MEDICAL OFFICER at The Manor—a hospital with specialised facilities for the socio-industrial habilitation of high-grade defectives. This Hospital is recognised by the Conjoint Board for 12 of the 24 months training required under the D.P.M. regulations.

Apply, with names of 2 referees, to Physician-Superintendent.

EDINBURGH NORTHERN GROUP OF HOSPITALS. JUNIOR HOSPITAL MEDICAL OFFICER in Anæsthetics required, and in the first instance the appointment will be to the Western General Hospital. Hospital recognised for D.A. and F.F.A.R.C.S.

Applications, with names of 2 referees, to the Medical Superintendent, Western General Hospital, Edinburgh, 4.

GAINSBOROUGH. JOHN COUPLAND HOSPITAL. (40 Beds.) Applications are invited for the post of RESIDENT MEDICAL OFFICER. The Hospital has a number of both medical and surgical beds. Salary is in accordance with Junior Hospital Medical Officer grade of the terms laid down for hospital medical and dental staffs. Married quarters are available.

Applications, giving full particulars, should be forwarded as soon as possible to—

R. W. HOWICK, Group Secretary,
Lincoln No. 1 Hospital Management Committee.
County Hospital, Lincoln.

GRIMSBY GENERAL HOSPITAL. Grimsby Hospital MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER for casualty duties required. Resident post. Recognised by Royal College of Surgeons for the Final Fellowship examination. Night duty on rota with all other resident staff. Establishment consists of Senior Hospital Medical Officer (casualty) and the post now being advertised. The Hospital possesses a well-equipped Medical Library.

Applications, with names and addresses of 2 referees, to the Hospital Secretary, Grimsby General Hospital.

GRIMSBY GENERAL HOSPITAL. Grimsby Hospital MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (orthopædic). Orthopædic Unit of 74 Beds. Up-to-date Medical Library and reading facilities available.

Applications, with names of 2 referees, to Hospital Secretary.

GUILDFORD. ROYAL SURREY COUNTY HOSPITAL. (233 Beds.) RESIDENT HOUSE SURGEON required for general surgery. Post is vacant on 1st June and tenable for 6 months. It is approved for pre-registration practitioners and recognised for the F.R.C.S. examination.

Applications, with copies of 3 testimonials, should be sent to the Hospital Secretary as soon as possible.

HAILSHAM. HELLINGLY MENTAL HOSPITAL. HAILSHAM HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER. Single residential accommodation available. Salary £775–£1075 p.a., commencing point in accordance with experience. Post offers experience in all branches of psychiatry, including all forms of modern treatment. High admission-rate. Hospital recognised for D.P.M.

Applications, stating age, qualifications and appointments held, to the Medical Superintendent, Hellingly Hospital, Hailsham, Sussex.

HALIFAX GENERAL HOSPITAL. (425 Beds.) House SURGEON (general surgery) required. Approved pre-registration appointment. Post now vacant.

Applications to the Group Secretary, Royal Halifax Infirmary, Halifax.

HASTINGS AND ST. LEONARDS-ON-SEA. BUCHANAN HOSPITAL. (94 Beds.) Locum SENIOR HOUSE OFFICER (urology and children's surgery), 18th June–1st July, 1956. Salary £14 10s. per week, less £2 17s. 8d. for full board.

Apply, with names of 3 referees, to Hospital Administrator.

HASTINGS. ROYAL EAST SUSSEX HOSPITAL. (148 Beds.) HOUSE PHYSICIAN (pre-registration post), vacant 17th June. National scale of salary.

Apply to Hospital Administrator.

HASTINGS GROUP HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (anæsthetics) for duties within the Group. Post, vacant about 18th May, is recognised for Diploma in Anæsthetics. Salary £745 p.a.

Apply to Group Secretary, 11, Holmesdale-gardens, Hastings.

HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL. (167 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (pædiatrics) which is recognised for the D.C.H. and which becomes vacant on 16th June, 1956. Applications, stating 2 names for reference, should be sent to the Hospital Secretary.

HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL. CASUALTY OFFICER (Junior Hospital Medical Officer) required.

Applications, stating 2 names for reference, should be sent to the Hospital Secretary.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for appointment of HOUSE SURGEON—general, gynæcology and obstetrics (first or second post). Recognised under F.R.C.S. regulations, pre-registration post. Duties to commence 16th June, 1956.

Applications to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for appointment of RESIDENT HOUSE PHYSICIAN (Male or Female), second post held. Recognised pre-registration post. 6 months appointment. Preference given to applicants who have held resident surgical or medical posts in general hospital. Duties to commence 19th June, 1956.

Applications to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

HULL A GROUP HOSPITAL MANAGEMENT COM-MITTEE. HOUSE PHYSICIAN (Pædiatric Unit). Duties at Victoria Children's Hospital for 3 months, followed by 3 months on the pædiatric wards, Western General Hospital. An interesting and varied post which includes outpatient and casualty work. This appointment, which commences on 1st July, 1956, is recognised for the D.C.H.

Apply, giving experience, testimonials, &c., to the Secretary, Victoria Hospital for Sick Children, Park-street, Hull.

HUNTINGDON COUNTY HOSPITAL. Applications are invited for the post of HOUSE OFFICER (surgical) vacant mid-June. Post recognised for pre-registration purposes.

Apply, with full particulars and names of 2 referees, to Secretary, County Hospital, Huntingdon.

HAVERFORDWEST. PEMBROKE COUNTY WAR MEMORIAL HOSPITAL. (163 Beds. Recognised by the Royal College of Surgeons, and for Pre-registration Service.) WEST WALES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (surgical), which is now vacant. Salary and conditions of service as laid down by the Ministry of Health.

Applications, stating age, qualifications, experience, nationality with names and addresses of 3 referees, to the Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

ILFORD. KING GEORGE HOSPITAL. There will be a vacancy for a CASUALTY OFFICER at the above Hospital on 15th June, 1956, at a salary of £745 p.a., resident or non-resident. Senior House Officer grade. This post is recognised for the F.R.C.S.

Applications, giving full particulars and accompanied by testimonials, should be sent to the undersigned within 7 days of the appearance of this advertisement.

H. F. HARRIS, Group Secretary, Ilford
and Barking Group Hospital Management Committee.
King George Hospital, Ilford.

IPSWICH AND EAST SUFFOLK HOSPITAL. Anglesea ROAD WING. (356 Beds.) Applications are invited for the post of HOUSE SURGEON to the E.N.T. and Ophthalmic Departments, vacant on 13th June, 1956. The post is recognised for pre-registration and for the D.L.O. examination.

Applications, giving full particulars and copies of recent testimonials, to Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL, Anglesea ROAD WING. (356 Beds.) Applications are invited for the post of HOUSE SURGEON to the Fracture and Orthopædic Department, vacant on 13th June, 1956. Approved pre-registration post.

Applications, with copies of recent testimonials, to the Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL. Anglesea ROAD WING. (356 Beds.) Applications are invited for the post of HOUSE SURGEON to the General Consultant Surgeon, vacant now. The post is recognised for pre-registration and for the F.R.C.S. examinations.

Applications, with copies of recent testimonials, to the Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL. Anglesea ROAD WING. (356 Beds.) Applications are invited for the post of CASUALTY OFFICER (Senior House Officer grade), vacant on 12th June, 1956. The post is recognised for the F.R.C.S. examination.

Applications, stating age and nationality, together with copies of recent testimonials, to Hospital Secretary.

LANCASTER. ROYAL LANCASTER INFIRMARY. (233 Beds.) SENIOR HOUSE OFFICER (medical). Duties include care of acute cases under the supervision of 2 Consultant Physicians and attendance at Consultative Clinics. The post is normally tenable for 1 year.

Applications, with names of 2 referees, to be addressed to the Group Secretary, Royal Lancaster Infirmary.

LEEDS REGIONAL HOSPITAL BOARD. Registrar vacancies.

Obstetrics and Gynæcology

(*a*) Wakefield A and B Groups (with occasional duties in Pontefract and Goole Groups). Married accommodation available. Aggregate of 120 obstetric and 50 gynæcological beds.

(*b*) Halifax General Hospital, with additional duties at Halifax Royal Infirmary (100 obstetric and 35 gynæcological beds). Recognised for the M.R.C.O.G. Resident.

(*c*) Leeds A Group. Duties to alternate (6 months periods) between St. Mary's Hospital, Leeds (109 obstetric beds) and St. James's Hospital, Leeds (74 obstetric beds and 52 gynæcological beds). Resident. Recognised for M.R.C.O.G.

Orthopædic Surgery

Pinderfields General Hospital, Wakefield (70 short-stay and 160 long-stay orthopædic beds) and at other hospitals in the Wakefield A and B Groups. Recognised for F.R.C.S. May include some duties in Casualty Department. Resident.

Applications, stating age, qualifications and details of present and previous appointments showing dates, together with the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, by 31st May, 1956.

LEICESTER. TOWERS MENTAL HOSPITAL. (1168 Beds.) Applications are invited for the whole-time post of JUNIOR HOSPITAL MEDICAL OFFICER. Salary £775 p.a.–£50–£1075. There is ample opportunity for experience in all branches of psychiatry including outpatient work and the Hospital is recognised for D.P.M. experience. Accommodation will be available for a married applicant and an appropriate charge will be made. Candidates must have completed their service with H.M. Forces.

Applications, giving age, nationality, and full details with the names of 2 referees, to be sent to the Medical Superintendent as soon as possible.

LUTON AND DUNSTABLE HOSPITAL. (250 Beds.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. ANÆSTHETIC REGISTRAR (resident) required at above Hospital and associated units (134 Beds). Post vacant 31st May, 1956. The Hospital may be visited by direct appointment.

Application forms obtainable from, and returnable to Secretary, Luton and Hitchin Group Hospital Management Committee, St. Mary's Hospital, Luton, Beds, by 29th May, 1956.

LUTON AND DUNSTABLE HOSPITAL, Luton, Bedford-SHIRE. Locum SENIOR SURGICAL REGISTRAR required 1st June, 1956, for a month (or possibly longer) pending a permanent appointment.

Applications to be sent to the Secretary, Luton and Hitchin Hospital Management Committee, St. Mary's Hospital, Luton, as soon as possible.

LINCOLN. LAWN HOSPITAL, Union-road. (Mental Hospital for Private Patients—100 Beds.) LINCOLN NO. 2 HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER (full-time). Salary and conditions of service in accordance with latest recommendations of Whitley Council. A small flat is available.

Apply as early as possible to the Medical Superintendent.

LINCOLN COUNTY HOSPITAL. (200 Beds.) Applications are invited from pre-registration candidates for an appointment as HOUSE SURGEON for 6 months to be followed, if satisfactory, by an appointment as House Physician for a further 6 months.

Apply, giving full particulars, to—
R. W. HOWICK, Group Secretary.

LEAMINGTON SPA. WARNEFORD GENERAL HOSPITAL. (197 Beds.) RESIDENT HOUSE SURGEON (general surgery). Post vacant 31st May. Recognised for pre-registration, and F.R.C.S. Post provides excellent experience. Good accommodation available.

Apply Hospital Secretary.

MANCHESTER. SOUTH MANCHESTER HOSPITAL. MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (anæsthetics) with duties in the South Manchester Group. This post is recognised by the Royal College of Surgeons for the F.F.A.R.C.S. and for the D.A.

Applications, stating age, qualifications, present post, experience, and names of 2 referees, to be forwarded immediately to the Group Secretary, Withington Hospital, Manchester, 20.

MANCHESTER, 8. CRUMPSALL HOSPITAL. Applications are invited for the post of CASUALTY OFFICER (Senior House Officer) with duties in the Department of Orthopædic Surgery. Recognised for F.R.C.S. Vacant 11th July, 1956.

Applications, with full details and names of 2 referees, by 28th May, 1956, to Group Secretary, North Manchester Hospital Management Committee, Crumpsall Hospital, Manchester, 8.

MANCHESTER, 8. CRUMPSALL HOSPITAL. Applications are invited for the resident appointment of SENIOR HOUSE OFFICER in the Genito-urinary Department with general surgical work in another unit at the above Hospital. Recognised for F.R.C.S. Vacant 30th July, 1956.

Applications, with full details and names of 2 referees, by 28th May, 1956, to Group Secretary, North Manchester Hospital Management Committee, Crumpsall Hospital, Manchester, 8.

MANCHESTER REGIONAL HOSPITAL BOARD. SALFORD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the whole-time post of REGISTRAR in Psychiatry at Salford Royal and Hope Hospitals, Salford. At Hope Hospital 8 beds are allotted to psychiatry in the general medical wards and a varying number of amenity beds is also available. Last year 90 cases were admitted and there were 4000 outpatient attendances at the 2 hospitals. Candidates should be particularly interested in prophylactic measures in psychotherapy, and social psychiatry. The work includes attendance at social therapeutic clubs and a day hospital. The successful candidate will be expected to read for the D.P.M. and arrangements may be made with the University of Manchester for this purpose.

Applications, with names and addresses of 2 referees, should be forwarded to the Group Secretary, Salford Royal Hospital, Salford, 3, before 2nd June, 1956.

MANCHESTER REGIONAL HOSPITAL BOARD. Applications are invited for the post of REGISTRAR in Chest Diseases, the main duties to be with the Bury and Rossendale Hospital Management Committee, with duties at Chest Clinics and at Aitken Sanatorium and Peel Hall Pulmonary Hospital, and other hospitals in the area.

Apply, stating names of 2 referees, to—
H. WILKINSON, Group Secretary.

Bury General Hospital, Bury, Lancs.

MANCHESTER REGIONAL HOSPITAL BOARD. SALFORD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for post of REGISTRAR in Surgery (Resident Surgical Officer) at Salford Royal Hospital, vacant 22nd June, 1956. Previous experience in surgery essential, F.R.C.S. or higher surgical qualification desirable.

Applications, together with names of 2 referees, to be sent to Group Secretary, Salford Royal Hospital, Salford, 3, immediately.

MANCHESTER REGIONAL HOSPITAL BOARD invites applications for the post of RESIDENT REGISTRAR in General Medicine, vacant 1st August, 1956. The duties will be with the Stockport and Buxton Hospital Management Committee with main duties at Stepping Hill Hospital and Stockport Infirmary.

Applications, stating age, experience and qualifications, together with copies of 2 testimonials, to be forwarded to the Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport.

MANCHESTER REGIONAL HOSPITAL BOARD invites applications for the post of REGISTRAR in Pathology. The duties will be with the Stockport and Buxton Hospital Management Committee and the successful candidate will work under the direction of the Consultant Group Pathologist.

Applications, stating age, experience, and qualifications, together with copies of 2 testimonials, to be addressed to the Group Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport, Cheshire.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS, MANCHESTER. Applications are invited for 3 posts of HOUSE OFFICER in Obstetrics, 2 of which are for provisionally registered medical practitioners. Salary in accordance with national scale. The appointments are for 6 months from 1st August, 1956.

Application forms may be obtained from the undersigned and returned not later than 28th May, 1956.

A. R. WISE, General Superintendent.

Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13.

5 HOUSE PHYSICIANS.
HOUSE PHYSICIAN to Department of Cardiology.
HOUSE PHYSICIAN to Department of Hæmatology.
8 HOUSE SURGEONS.
2 HOUSE SURGEONS to E.N.T. Department.
2 HOUSE SURGEONS to Neurosurgical Department.
3 HOUSE SURGEONS to Orthopædic Department.

Posts tenable for 6 months from 15th and 22nd July, 1956.

Application form obtainable from the undersigned, to be returned as soon as possible. G. H. TAYLOR, Secretary.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS, MANCHESTER. Applications are invited for the post of OBSTETRICAL HOUSE SURGEON to a Maternity Unit operating temporarily in the Whitworth Park Branch of the above-named Hospital, vacant 1st August, 1956. The post is supernumerary to the establishment recognised for training purposes by the Royal College of Obstetricians and Gynæcologists. Previous obstetrical experience is desirable. An opportunity exists for a limited amount of gynæcological training during tenure of the post. National scale.

Application forms, which may be obtained from the undersigned, to be returned not later than 28th May, 1956.

A. R. WISE, General Superintendent.

Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS, MANCHESTER. Applications are invited from registered medical practitioners, Male or Female, for the post of HOUSE PHYSICIAN in the Neonatal Unit of Saint Mary's Hospitals (attached to the University Department of Child Health) for a period of 6 months, vacant on 1st August, 1956. Previous hospital experience essential and pædiatric experience desirable. Duties include the care of the newborn in the Maternity Department, the care of infants in the infants' ward, and work in the clinics under the charge of the Department of Child Health. Salary in accordance with national scale.

Applications, stating qualifications and experience, together with the names of 3 referees, should be sent to the undersigned not later than 4th June, 1956.

A. R. WISE, General Superintendent.

Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. 3 RESIDENT CLINICAL PATHOLOGISTS (Senior House Officer grade) to commence on 1st and 17th August and 1st September, 1956. Whole-time appointment for 12 months. Residence £155 p.a. Applicants should have held house appointments. Previous laboratory experience is not essential. Duties consist of routine clinical pathology under the Director of the Department of Clinical Pathology.

Applications to be made on forms obtainable from the undersigned and to be returned not later than 2nd June, 1956.

G. H. TAYLOR, Secretary.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. SENIOR HOUSE OFFICER (medical) to commence on 19th September, 1956. Whole-time resident post, for 6 months, renewable for a second and possibly a third 6 months. Residence £155 p.a. The successful applicant will be attached to the Rheumatism Research Centre but will have some general duties as deputy Resident Medical Officer.

Application to be made on form obtainable from the undersigned and to be returned not later than 2nd June, 1956.

G. H. TAYLOR, Secretary.

MANCHESTER (near). ALTRINCHAM GENERAL HOSPITAL AND ANNEXE. (130 Beds.) NORTH AND MID-CHESHIRE HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (surgical). This appointment affords excellent experience to suitably qualified candidates. Post recognised under F.R.C.S. regulations.

Applications to Group Secretary, North and Mid-Cheshire Hospital Management Committee, The Hospital, Sinderland-road, Altrincham, Cheshire.

MANCHESTER, 19. THE DUCHESS OF YORK HOSPITAL FOR BABIES. SOUTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. There will be a vacancy at the above Hospital, which is associated with the Manchester University for teaching purposes, for a HOUSE OFFICER (Male or Female) pre- or post-registration, for 6 months commencing 1st July, 1956.

Applications, with copies of 3 testimonials, to be sent to the Administrative Officer of the Hospital, as soon as possible.

MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT ANÆSTHETIST for joint duties at the West Kent General Hospital, and the Kent County Ophthalmic and Aural Hospital, Maidstone (total beds 254). The post, which is of Senior House Officer grade, will be vacant June, 1956, and carries a salary of £745 a year, less £150 for residential emoluments. Excellent experience under Consultant Anæsthetists is available, and the post is recognised for the F.F.A.R.C.S. examination.

Applications, stating age, nationality, qualifications and experience, together with the names of 2 suitable referees, should be forwarded to the Administrative Officer, West Kent General Hospital, Maidstone.

MAIDSTONE. KENT COUNTY OPHTHALMIC AND AURAL HOSPITAL. (113 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE SURGEON in the E.N.T. Department of the above Hospital. Post vacant now. There are 55 E.N.T. beds and 6 specialist operating sessions each week. Valuable experience is available, and the post is recognised for the purpose of the F.R.C.S. and the D.L.O. Salary will be £745 a year, less £150 a year for residential emoluments.

Applications immediately to the Administrative Officer, Kent County Ophthalmic and Aural Hospital, Maidstone, Kent.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. CASUALTY OFFICER (Senior House Officer). Recognised for F.R.C.S. Salary £745 a year, less £150 a year for board and lodging. Post vacant June, 1956.

Applications to the Administrative Officer at the Hospital.

MAIDENHEAD HOSPITAL, Berkshire. Applications invited from registered practitioners for post of CASUALTY OFFICER, vacant now. Post recognised for F.R.C.S. Salary on House Officer scale plus £50 p.a.

Applications, stating age, qualifications and nationality, with copies of testimonials or names of 3 referees, to Secretary.

MIDDLESBROUGH GENERAL HOSPITAL, Ayresome Green-lane, MIDDLESBROUGH. TEES-SIDE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER (pædiatrics) at the above Hospital. The Pædiatric Unit is a very active one of 60 Beds and Cots for acute cases and a busy Outpatient Department. The post is recognised for the D.C.H. examination.

Applications, stating age, qualifications, and giving 2 names for reference, should be forwarded to the Hospital Secretary.

NEWPORT, I.W. ST. MARY'S HOSPITAL. Isle of Wight GROUP HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (salary £745) or HOUSE OFFICER for Pre-registration Service (salary £425–£525 according to experience) required as House Surgeon. Post recognised for F.R.C.S. Vacant end of June.

Applications, with names of 2 referees, to Hospital Secretary, not later than 4th June, 1956.

NEWCASTLE UPON TYNE HOSPITAL MANAGEMENT COMMITTEE AND HEXHAM AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. DEPARTMENTS OF OBSTETRICS AND GYNÆCOLOGY. Applications are invited for the following posts, vacant on 7th July, 1956 :—

(1) **Newcastle General Hospital** (838 Beds)

(*a*) Department of Obstetrics (70 Beds) : HOUSE SURGEON (resident) pre-registration.

(*b*) Department of Gynæcology (30 Beds): HOUSE SURGEON (resident) pre-registration.

This department is recognised for the M.R.C.O.G., and D.Obst.R.C.O.G., and undertakes the training of medical students in the University of Durham. Preference will be given to provisionally registered candidates who have carried out their first house appointment. Consideration may be given to the possibility of alternating these posts.

(2) **Hexham General Hospital** (314 Beds)

Gynæcology : HOUSE SURGEON (resident), pre-registration. Recognised for M.R.C.O.G. Applications considered from final year students in anticipation of graduation.

(3) **Dilston Hall Maternity Hospital, Corbridge** (50 Beds)

Obstetrics : HOUSE SURGEON (resident), pre-registration. Recognised for D.Obst.R.C.O.G.

Applications, together with 1 copy of 2 recent testimonials, should be sent to the Secretary, Newcastle General Hospital, Westgate-road, Newcastle upon Tyne, 4, by 9th June, 1956.

NEWCASTLE UPON TYNE HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER in Ophthalmology.

Inpatient Unit (44 Beds)—Walker Gate Hospital.

Children's Unit (21 Beds)—Walker Accident Hospital.

Outpatient Department—Newcastle General Hospital.

Applications are invited from registered medical practitioners for the above post (preferably resident—single accommodation available Walker Gate Hospital). The Units are recognised for the Diploma of Ophthalmology. Salary in accordance with the terms and conditions of hospital medical and dental staffs.

Applications, together with the names and addresses of 3 referees, to be sent as soon as possible to the Secretary, Newcastle Eye Hospital, St. Mary's-place, Newcastle upon Tyne, 1.

NEWCASTLE GENERAL HOSPITAL. (838 Beds). NEWCASTLE UPON TYNE HOSPITAL MANAGEMENT COMMITTEE. The following posts become vacant on 7th July, 1956 (resident). Undergraduate teaching is conducted in most departments of the Hospital.

- HOUSE PHYSICIANS (4), General Medical Wards. (2 of these posts rotate with the House Physician post in the Cardiovascular Department.)
- HOUSE PHYSICIAN (1), Cardiovascular Department. (This post rotates with the 2 House Physician posts in general medicine.)

HOUSE PHYSICIANS (4), Pædiatrics. Hospital for Sick Children, Newcastle upon Tyne (2), and Children's Department, Newcastle General Hospital (2).

3 of the posts are for pre-registration candidates (M. and S.). The posts offer experience in the whole of the pædiatric work of the hospitals, including general medicine and surgery and the special departments. There is a close association with the University Department of Child Health.

- HOUSE PHYSICIAN (1), Geriatric Unit.
- HOUSE SURGEONS (2), General Surgery. (Recognised for the F.R.C.S. Diploma.)
- HOUSE SURGEON (1) Accident and Admission Department. (Recognised for F.R.C.S. Diploma.)

* These posts are recognised for the purpose of Pre-registration Service and applications will be accepted from students on the point of taking their qualifying examinations.

Applications, together with 1 copy of 2 recent testimonials, should be sent to the Secretary, Newcastle General Hospital, Westgate-road, Newcastle upon Tyne, 4, by 9th June, 1956.

NEWCASTLE GENERAL HOSPITAL. (Department of Neurological Surgery : Regional Unit.) NEWCASTLE UPON TYNE HOSPITAL MANAGEMENT COMMITTEE. The post of SENIOR HOUSE OFFICER (either resident or non-resident) becomes vacant on 1st July, 1956.

Applications, with 1 copy of 2 recent testimonials, should be sent to the Secretary, Newcastle General Hospital, Newcastle upon Tyne, 4.

NEWCASTLE REGIONAL HOSPITAL BOARD. Tees-SIDE HOSPITAL MANAGEMENT COMMITTEE.

REGISTRAR PÆDIATRICIAN (whole-time), General Hospital, Middlesbrough. Single accommodation available.

SENIOR HOUSE OFFICER (pædiatrics), whole-time, General Hospital, Middlesbrough. Single accommodation available.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Walker Gate Hospital, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. Regional THORACIC SERVICE. REGISTRAR THORACIC SURGEON (whole-time) at Regional Thoracic Centre (150 Beds), Shotley Bridge General Hospital. Work almost entirely non-tuberculosis (cardiovascular, œsophageal, and pulmonary), and at associated sanatoria. Higher qualification necessary and some experience in chest surgery an advantage. Appointment intended for trainee in thoracic surgery.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Walker Gate Hospital, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Applications are invited for the non-resident appointment of REGISTRAR to the Throat, Nose and Ear Department at the Royal Victoria Infirmary. The appointment is for 1 year in the first instance and is subject to Ministry of Health terms and conditions of service.

Applications, giving full details and the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.

Royal Victoria Infirmary, Newcastle upon Tyne.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Applications are invited for the whole-time non-resident appointment of REGISTRAR in the Department of Dermatology at the Royal Victoria Infirmary. The appointment is for 1 year in the first instance and is subject to the terms and conditions of Service of hospital medical staff in the National Health Service.

Applications, giving full details and the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.

Royal Victoria Infirmary, Newcastle upon Tyne.

NEWMARKET GENERAL HOSPITAL, Suffolk. Applications are invited for the post of HOUSE PHYSICIAN, vacant 13th July, 1956. Duties include house charge of general medical and pulmonary tuberculosis beds. The post is recognised for pre-registration, is resident and tenable for 6 months. Salary in accordance with national scale.

Applications, together with 3 recent testimonials, to Medical Superintendent.

NEWMARKET GENERAL HOSPITAL, Suffolk. Senior HOUSE SURGEON (Senior House Officer grade). Tenable for 6 months in first instance. Duties mainly surgical, but a small amount of E.N.T., and ophthalmic surgery is included. Preference to candidates who wish to be trained in surgical technique and to gain experience in operative surgery.

Applications, with copies of 3 testimonials, to Medical Superintendent.

NEWMARKET GENERAL HOSPITAL, Suffolk. Applications invited for the post, now vacant, of SENIOR HOUSE OFFICER for orthopædic and casualty duties.

Applications, with 3 testimonials, to the Medical Superintendent.

NEWMARKET GENERAL HOSPITAL, Suffolk. Applications are invited for the post of HOUSE SURGEON, vacant 9th June, 1956. Duties include surgical House charge of general surgical E.N.T. and eye cases. Post resident and available for 6 months, recognised for pre-registration.

Applications, with copies of 3 testimonials, to the Medical Superintendent.

NEWTON ABBOT HOSPITAL. (General Section—65 Beds.) RESIDENT SENIOR HOUSE SURGEON (Male or Female) required early June, 1956. Married quarters available.

Applications (quoting ref. F.364/35), stating qualifications, nationality, age, with copy testimonials, to be sent to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

NOTTINGHAM HEATHFIELD HOSPITAL (Infectious Diseases), Hucknall-road, NOTTINGHAM. Resident Locum MEDICAL OFFICER (Male or Female) required for holiday period of 8 weeks (July and August). Junior Hospital Medical Officer rate £17 10s. per week, less residential emoluments. Previous fever experience not essential.

Applications, with copies of 2 recent testimonials, as soon as possible to Physician-Superintendent.

NOTTINGHAM. CITY HOSPITAL. (811 Beds.) Applications are invited for the post of RESIDENT ANÆSTHETIST (Senior House Officer), vacant 1st June, 1956. The post is recognised for the D.A. and the F.F.A.R.C.S. and offers wide experience ; this is a busy general hospital with Departments in General, Orthopædic, Gynæcological, Thoracic, and Plastic Surgery.

Applications, stating age, nationality and qualifications, together with copies of not more than 3 testimonials, to be sent to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM. CITY HOSPITAL. (811 Beds. Recognised for training M.R.C.O.G.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (obstetrics and gynæcology) required for 1 year in first instance.

Apply to the Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 28th May, giving age, nationality, qualifications, present and previous appointments with dates, and naming 3 referees.

NOTTINGHAM. CITY HOSPITAL. (811 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER to the Department of Thoracic Surgery. Post vacant 1st June, 1956. Salary £745 p.a., less £150 p.a. for residential emoluments. The appointment will be for 1 year.

Applications, stating age, nationality, qualifications and experience, together with copies of not more than 3 testimonials, to be submitted immediately to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. Resident HOUSE SURGEONS (2) pre-registration (first or second post) required as soon as possible for 6 months.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. Resident Pre-registration HOUSE PHYSICIANS required. Duties to commence about end of May.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. Senior SURGICAL HOUSE OFFICER required at the above Hospital. Good opportunity for obtaining operating experience in general surgery. Recognised for the F.R.C.S. Duties to commence as soon as possible.

Applications, stating age, qualifications, and experience, together with copies of testimonials, to be sent to the Group Secretary, General Hospital, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. (441 Beds. Recognised for training for F.R.C.S.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT or NON-RESIDENT CASUALTY REGISTRAR required. This busy department provides excellent experience. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 28th May, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

NOTTINGHAM. HIGHBURY HOSPITAL. Senior MEDICAL HOUSE OFFICER required at the above Hospital, Resident. Duties to commence on or about 17th July, 1956. The successful candidate will, in addition to medical duties, have an opportunity of assisting in the Obstetric Unit. This post will be accepted as a general medical appointment entry to the M.R.C.O.G. examination.

Apply in writing, stating age, qualifications and experience, together with copies of testimonials, to the Group Secretary, General Hospital, Nottingham.

NOTTINGHAM. HIGHBURY HOSPITAL. Applications are invited from fully registered medical practitioners for the post of SENIOR HOUSE OFFICER in the Obstetrical and Gynæcological Department (41 obstetric beds, 11 gynæcological beds and a small block for puerperal pyrexia). The appointment is for a period of 12 months to commence 1st July. The Hospital is recognised for the M.R.C.O.G. (obstetrics only). Previous obstetric experience required.

Applications, stating age, qualifications, and experience also nationality, together with copies of recent testimonials, to be sent to Group Secretary, General Hospital, Nottingham.

NUNEATON. GEORGE ELIOT HOSPITAL. House SURGEON (pre-registration), resident. Recognised F.R.C.S No casualty duties.

Applications to Hospital Secretary.

OXFORD. NUFFIELD DEPARTMENT OF OBSTET-RICS AND GYNÆCOLOGY. (UNIVERSITY OF OXFORD.) Applications are invited for the post of Whole-time NON-RESIDENT ASSISTANT under the direction of Prof. Chassar Moir. Applicants must be members of the Royal College of Obstetricians and Gynæcologists and have had good operative experience. The work is chiefly clinical and there is opportunity for research. Salary £1200 p.a. or according to experience.

Applications should be addressed to the Secretary, Nuffield Department of Obstetrics and Gynæcology, Radcliffe Infirmary, Oxford, and should be received before 4th June.

OXFORD. UNITED OXFORD HOSPITALS. The Rad-CLIFFE INFIRMARY. Applications are invited for the post of REGISTRAR/RESEARCH ASSISTANT to the Accident Service from 1st July, 1956. The duties of this post will be divided equally between the clinical duties of the Registrar appointment and research work in the department, under the supervision of the Director of the Accident Service.

Applications, on forms obtainable from the Administrator, Radcliffe Infirmary, Oxford, should be received not later than 1st June, 1956.

OXFORD. WARNEFORD AND PARK HOSPITALS MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER wanted. Warneford Hospital (150 Beds) is an acute Psychiatric Unit, specially related to research and postgraduate teaching. The adjacent Park Hospital is a Neurosis Centre (34 Beds) with daily outpatient clinics. Previous psychiatric experience not essential. This post is specially suitable for training for D.P.M. for which full facilities are available, including neurology and child psychiatry. The post is resident with accommodation for a single man or woman.

Further particulars may be obtained from the Physician-Superintendent, Warneford Hospital, Oxford, to whom application should be sent, with the names of 2 referees, by 9th June.

POOLE GENERAL AND ALDERNEY HOSPITALS, DORSET. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. HOUSE PHYSICIAN (pre-registration intern) required for duties at the above hospitals. Resident at Alderney Hospital. The post becomes vacant on 14th June, 1956.

Applications to the Hospital Secretary.

POOLE GENERAL HOSPITAL, Longfleet-road, Poole, DORSET. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. 2 HOUSE SURGEONS (pre-registration) required. 1 post vacant immediately, and second on 20th June, 1956. Posts recognised for F.R.C.S. and F.R.C.S.E.

Applications to the Hospital Secretary at the Hospital.

POOLE GENERAL HOSPITAL, Poole, Dorset. Bourne-MOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of HOUSE SURGEON. The post which is now vacant is recognised for the F.R.C.S. examination and pre-registration purposes.

Applications to the Hospital Secretary.

PORTSMOUTH. ST. MARY'S HOSPITAL. Applications are invited for the appointment of SENIOR HOUSE PHYSICIAN at above Hospital. The duties will be mainly in medical wards that form an admission unit for 430 geriatric beds in the Group. A Consultant Physician being in charge of this unit. In addition the successful candidate will have duties in respect of 20 acute medical beds in the Hospital.

Applications, giving age, nationality, qualifications and experience, together with the names and addresses of 2 referees, should be sent to the Group Secretary, Portsmouth Group Hospital Management Committee, 35, Grove-road South, Southsea.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE.

Queen Alexandra Hospital (87 surgical beds)
HOUSE SURGEON (pre-registration), vacant now.
Queen Alexandra Hospital (78 medical beds)
HOUSE PHYSICIAN (pre-registration), vacant now.
Saint Mary's Hospital (130 surgical beds)
HOUSE SURGEON (pre-registration), vacant now.
Saint Mary's Hospital
SENIOR HOUSE OFFICER (gynæcology) required. The department consists of 50 Beds and offers excellent facilities for training. Recognised for the M.R.C.O.G. Vacant 16th June, 1956.
Royal Portsmouth Hospital (Orthopædic Department —104 Beds)
HOUSE OFFICER (pre-registration), vacant now.

Applications, stating age, experience, and qualifications, together with names of 2 referees, should be forwarded as soon as possible to E. H. HURST.

35, Grove-road South, Southsea.

PETERBOROUGH. THE MEMORIAL HOSPITAL. PETERBOROUGH AND STAMFORD HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (orthopædic). Applications are invited for this position, vacant now. Exceptional experience offered in busy department.

Apply to the Secretary, Memorial Hospital, Peterborough.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL.

SENIOR HOUSE OFFICER in Surgery, vacant immediately. Recognised for the F.R.C.S. Greenbank Road Section.

SENIOR HOUSE OFFICER in Casualty, vacant 1st July, 1956. Recognised for the F.R.C.S. The Central Casualty Department, South Devon and East Cornwall Hospital, Freedom Fields, Plymouth.

HOUSE SURGEONS (pre-registration posts), vacancies 12th June and 1st July, 1956. Recognised for the F.R.C.S. Greenbank Road Section.

HOUSE SURGEONS (pre-registration posts), 2 vacancies 1st July, 1956. Recognised for the F.R.C.S. Freedom Fields Section.

Applications, stating age, nationality, qualifications and experience, with names of 3 referees, to be sent to—

ARTHUR R. CASH, Group Secretary, Plymouth,
South Devon and East Cornwall General Hospital Group.
7, Nelson-gardens, Stoke, Plymouth.

PONTEFRACT GENERAL INFIRMARY. House Surgeon required. Post vacant from 8th June, 1956. This is an approved pre-registration post under Medical Act, 1950, but applications will be considered from fully registered practitioners. Hospital approved under F.R.C.S. regulations, and provides excellent surgical experience.

Apply to the Secretary, Pontefract and Castleford Hospital Management Committee, Great Northern House, Salter-row, Pontefract, Yorkshire.

ROTHERHAM HOSPITAL, Doncaster Gate, Rotherham. (161 Beds. Recognised for training for the F.R.C.S. examination.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (orthopædics and casualty) required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 28th May, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

ROTHERHAM CLINICAL LABORATORY, Moorgate GENERAL HOSPITAL, ROTHERHAM. SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT or NON-RESIDENT REGISTRAR (pathology) required with additional duties at associated clinical laboratories within the area of the Rotherham and Mexborough Hospital Management Committee. Appointment for 1 year in the first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 28th May, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

READING COMBINED HOSPITALS. Area Department OF OBSTETRICS AND GYNÆCOLOGY. (100 Beds.) Applications are invited from registered medical practitioners, Male and Female, for the resident appointment of GYNÆCOLOGICAL HOUSE SURGEON at the Royal Berkshire Hospital, vacant 1st June and tenable for 6 months. Post recognised for M.R.C.O.G.

Write, stating age and qualifications, with dates, nationality, and present appointment, with a copy of 1 recent testimonial, to Secretary.

READING AREA DEPARTMENT OF MEDICINE. Applications are invited from provisionally registered medical practitioners for resident post of HOUSE PHYSICIAN, vacant 1st June, and tenable for 6 months. Successful candidate will be required to carry out duties at following Reading hospitals: Royal Berkshire (399 Beds), Battle (391 Beds), and Prospect Park (104 Beds).

Write immediately, stating age, qualifications with dates, nationality, present post, with copy of 1 recent testimonial, to Secretary, Royal Berkshire Hospital, Reading.

READING. ROYAL BERKSHIRE HOSPITAL. (399 Beds.) Applications are invited from provisionally registered medical practitioners, Male and Female, for resident post of HOUSE SURGEON, vacant 1st June, and tenable for 6 months.

Write immediately, stating age, qualifications with dates, nationality, present post, with copy of 1 recent testimonial, to Secretary.

RUSTINGTON, SUSSEX. ZACHARY MERTON MATERNITY HOSPITAL. (48 Beds.) Applications are invited for a RESIDENT HOUSE OFFICER (preferably Female). Salary £425–£525 according to experience, less £125 p.a. for emoluments.

Applications to be submitted to the undersigned immediately.

A. V. OAKTON, Group Secretary,
Worthing Group Hospital Management Committee.
129, Brighton-road, Worthing, Sussex.

RETFORD, NOTTINGHAMSHIRE. RAMPTON HOSPITAL. (1143 Beds for mental defectives exhibiting conduct disorders.) SENIOR REGISTRAR. Psychiatric experience desirable. House or quarters available.

Applications, naming 3 referees, to Medical Superintendent by 2nd June, 1956. Candidates may visit Hospital by appointment.

ROCHDALE AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required at Rochdale Infirmary, June. Pre-registration candidates eligible for this post, which is recognised for 6 months F.R.C.S. experience.

Apply at once to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale.

ROCHFORD, ESSEX. GENERAL HOSPITAL. (603 Beds.) Applications are invited from pre-registration candidates for a 6 months appointment of HOUSE SURGEON (recognised for F.R.C.S.) to be followed, subject to satisfactory service, by a 6 months appointment as HOUSE OFFICER (obstetrics) (recognised for D.Obst.R.C.O.G.). Post vacant 14th June, 1956.

Applications, accompanied by 1 testimonial, to reach the undersigned by 26th May, 1956. J. C. FIELD, Secretary.

ROMFORD, ESSEX. VICTORIA HOSPITAL. (99 Beds.) Temporary SURGICAL REGISTRAR (Male) required immediately.

Applications should be forwarded to Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) SENIOR HOUSE OFFICER required in the Department of Ophthalmology from 22nd May, 1956.

Applications should be addressed immediately to the Group Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

SALFORD ROYAL HOSPITAL. (258 Beds—General.) SALFORD HOSPITAL MANAGEMENT COMMITTEE. Applications invited for the appointment of SENIOR HOUSE OFFICER (Orthopædic and Casualty Departments), resident. Post vacant 1st June. Recognised F.R.C.S. Gives opportunity for experience in emergency surgery. Salary subject to deduction of £146 p.a. for board and lodging.

Applications, with copies of 3 recent testimonials, should be sent to the Secretary, Salford Royal Hospital, Chapel-street, Salford, 3.

SALISBURY GENERAL HOSPITAL. Pædiatric House OFFICER, Odstock Hospital. 55 medical and surgical beds. Recognised for D.C.H. Vacant 25th July.

Applications, with names and addresses of 2 referees, to Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury.

SALISBURY GENERAL HOSPITAL. Applications are invited for the post of RESIDENT or NON-RESIDENT CASUALTY OFFICER (Senior House Officer) for a period of 12 months. Post is recognised for F.R.C.S. and is vacant 9th July, 1956.

Applications, naming 2 referees, to Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury.

SALISBURY GENERAL HOSPITAL. Applications are invited for the appointment of SENIOR HOUSE OFFICER to the E.N.T. Department. Post is recognised for D.L.O. and F.R.C.S.

Applications, naming 2 referees, to Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury, Wilts.

SCUNTHORPE. WAR MEMORIAL HOSPITAL. (262 Beds.) Vacancy for RESIDENT HOUSE SURGEON early June—pre-registration post.

Applications, naming 2 referees, to Group Secretary, Scunthorpe Hospital Management Committee.

SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD. Pathology, MARYFIELD HOSPITAL, DUNDEE. Applications are invited for the post of ASSISTANT CLINICAL PATHOLOGIST (Registrar) at Maryfield Hospital, Dundee (370 Beds), 1 of the 2 general teaching hospitals in Dundee associated with the University of St. Andrews. Salary and conditions of service in accordance with national agreement.

Forms of application and further particulars from the Secretary to the Board, "Bracknowe," 430, Blackness-road, Dundee with whom applications must be lodged not later than 26th May, 1956.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of REGISTRAR in Orthopædic Surgery in the Royal Infirmary of Edinburgh.

Applications, giving particulars of age, qualifications and previous experience, together with the names of 2 referees, should be submitted to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, by 9th June, 1956.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the post of Temporary SUPERNUMERARY SENIOR REGISTRAR in Anæsthetics at the Royal Hospital for Sick Children, Edinburgh. The appointment is for 1 year.

Applications, giving particulars of age, previous experience and qualifications, together with the names of 3 referees, should be submitted to the Secretary, South-Eastern Regional Hospital Board, 11, Drumsheugh-gardens, Edinburgh, 3, by 11th June, 1956.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of REGISTRAR in Ophthalmology in the Professorial Unit at the Royal Infirmary of Edinburgh, vacant on 1st September, 1956.

Applications, giving particulars of age, previous experience and qualifications, together with the names of 2 referees, should be sent to the Secretary, South-Eastern Regional Hospital Board, 11, Drumsheugh-gardens, Edinburgh, 3, by 9th June.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of SENIOR REGISTRAR in the E.N.T. Department in the Edinburgh Northern Group of hospitals.

Applications, giving particulars of age, qualifications and previous experience, together with the names of 3 referees, should be submitted to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, by 9th June.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following appointments, which will be for 1 year in the first instance:—

REGISTRAR in Surgery for duties in the Neurosurgical Unit, Killearn Hospital, Stirlingshire.

REGISTRAR in General Surgery with duties in gynæcology based at the Royal Infirmary, Greenock.

REGISTRAR in Obstetrics and Gynæcology based at Braeholm Maternity Hospital, Helensburgh.

REGISTRAR in Pædiatrics for duties at Seafield Children's Hospital, Ayr, and at the Ayrshire Maternity Hospital.

These appointments are subject to the National Health Service (Scotland) superannuation regulations.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, by 9th June, 1956.

SCOTLAND. NORTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the post of SENIOR REGISTRAR in Diagnostic Radiology—main duties in Aberdeen General Hospitals. Candidates should have experience in their specialty and preferably hold an appropriate higher qualification.

Applications, giving 2 names for reference, should be submitted by 4th June, 1956, to the Secretary, 1, Albyn-place Aberdeen, from whom further particulars may be obtained.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. Applications invited for the following posts:—

(*a*) SENIOR REGISTRAR in Clinical Pathology. Possession of a higher qualification desirable but not essential. The appointment is for 1 year in the first instance and will be reviewed annually. It has been agreed in principle between the Board of Governors of The United Sheffield Hospitals and the Sheffield Regional Hospital Board that the appointment, if extended for the full period will be divided, subject to satisfactory work and progress, between The United Sheffield Hospitals and a hospital in the Region (at present the Derbyshire Royal Infirmary).

Closing date for applications 31st May, 1956.

Royal Infirmary Unit

(*b*) REGISTRAR in Thoracic Surgery.

Applications to be sent immediately.

(*c*) RESIDENT SENIOR HOUSE OFFICER in Clinical Pathology. Pathological experience not essential, but candidates must have previous clinical experience. The successful candidate will work in turn in the different branches of clinical pathology in the Laboratories of The United Sheffield Hospitals.

Applications to be sent immediately.

(*d*) NON-RESIDENT SENIOR HOUSE OFFICER in General Medicine. Post vacant 15th July.

Applications to be sent immediately.

Royal Hospital Unit

(*e*) OPHTHALMIC REGISTRAR. Post vacant 1st June. Diploma in Ophthalmology desirable.

Applications to be sent immediately.

(*f*) REGISTRAR to the E.N.T. Department.

Closing date for applications 26th May, 1956.

Applications for the above posts should state age, qualifications and experience, give the names of 3 referees, and be sent to the Chief Administrative Officer, The United Sheffield Hospitals, West-street, Sheffield, 1, except in the case of posts (*e*) and (*d*) where applications should be addressed to the Superintendent, Royal Infirmary, Sheffield, 6.

SIDCUP AND SWANLEY HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (general surgery and gynæcology) for duty from 1st June, 1956. The post is recognised by the R.C.S. of England under the regulations for the Fellowship and gives excellent experience of emergencies with a rapid turnover.

Applications, stating age, qualifications, and experience, should be addressed to the Secretary at Queen Mary's Hospital, Sidcup, Kent.

SHOREHAM-BY-SEA, SUSSEX. SOUTHLANDS HOSPITAL. (411 Beds.) CASUALTY OFFICER (Senior House Officer grade). New post, vacant now; recognised for F.R.C.S.

Application forms to be obtained from, and returned to, Surgeon-Superintendent, Southlands Hospital.

A. V. OAKTON, Group Secretary,
Worthing Group Hospital Management Committee.

SHREWSBURY. ROYAL SALOP INFIRMARY AND COPTHORNE HOSPITAL. (500 Beds.) RESIDENT ANÆSTHETIST (Senior House Officer). Post recognised for F.F.A.R.C.S. Registrar also employed. Vacant 1st June, 1956.

Applications and copy testimonials to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. WINDSOR GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required, pre-registration post, vacant 13th June.

Applications, with names of 2 referees, to Secretary, before 30th May.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. WINDSOR GROUP HOSPITAL MANAGEMENT COMMITTEE. Locum HOUSE OFFICER (casualty) required, 1 of 2, for busy Casualty Department. Experience provided in orthopædic and plastic cases.

Applications, with names of 2 referees, to Secretary.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Psychiatric Registrars training scheme. Applications are invited for the appointment of REGISTRAR for 6 months periods at the hospitals of St. Ebba's, Horton, Long Grove, and The Manor in succession. Wide experience is available in all forms of psychosis in neurosis, and in mental deficiency under modern methods of treatment. Special experience may be gained in the Mott Clinic for general paralysis, St. Ebba's Juvenile Unit and in Mapother House, Long Grove, for acute psychosis; also in the associated Observation Wards and Outpatient Departments. The appointment will be tenable from July, 1956. Salary, &c., in accordance with the agreed terms and conditions of service for hospital medical staff. For residents appropriate charges are made for full residential amenities. Candidates may visit the hospitals by appointment with the Physicians-Superintendent.

Application forms may be obtained from the Group Secretary, St. Ebba's and Belmont Group Hospital Management Committee, Group Office, Belmont Hospital, Brighton-road, Sutton, Surrey, and completed forms (5 copies) should be returned to him within 2 weeks of the appearance of this advertisement.

SOUTH-WESTERN REGIONAL HOSPITAL BOARD. Applications are invited from registered medical practitioners for the appointment of CLINICAL ASSISTANT to undertake 4 weekly sessions in Orthopædic and Traumatic Surgery. The successful candidate will work under the general direction of the Consultant Orthopædic Surgeons at the Gloucestershire Royal Hospital, Gloucester, and at the General, Eye and Children's Hospital, Cheltenham. Previous experience in orthopædic and traumatic surgery is essential. Payment will be at the rate of £175 p.a. per weekly 3¼-hour session. The post is tenable for 2 years but is subject to review at the end of the first year.

Applications, stating date of birth, qualifications and experience together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 31st May, 1956.

SOUTH-WESTERN REGIONAL HOSPITAL BOARD. Applications are invited from registered medical practitioners in general practice for the appointment of CLINICAL ASSISTANT in Pædiatrics to undertake 1 weekly session at the Royal United Hospital, Bath. The successful candidate will work under the general direction of the Consultant Pædiatricians attached to the Bath Hospitals Group. Previous experience in pædiatrics is desirable. Payment will be at the rate of £175 p.a. per weekly 3¼-hour session. The appointment will be held for 1 year and duties will commence on 5th July, 1956.

Applications, stating date of birth, qualifications and experience together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 31st May, 1956.

SOUTH-WESTERN REGIONAL HOSPITAL BOARD. Applications are invited from registered medical practitioners in general practice for 3 appointments as CLINICAL ASSISTANT in General Medicine, each for 1 weekly session at the Royal United Hospital, Bath. The successful candidates will work under the general direction of the Consultant Physicians attached to the Bath Hospitals Group. Payment will be at the rate of £175 p.a. per weekly 3¼-hour session. The appointments will be held for 1 year, and duties will commence on 5th July, 1956.

Applications, stating date of birth, qualifications and experience together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 31st May, 1956.

SUTTON. BELMONT HOSPITAL. South West Metropolitan Regional Hospital Board. Applications are invited for appointment as PSYCHIATRIC REGISTRAR at above Hospital, which is principally concerned with the treatment of neuroses and the early psychoses. There are ample opportunities for research and the Hospital, which is recognised for the D.P.M., takes an active part in teaching in association with teaching hospitals. Candidates may visit the Hospital by appointment with the Physician-Superintendent.

Application forms may be obtained from the Group Secretary, Group Office, Belmont Hospital, Brighton-road, Sutton, Surrey, and completed forms (5 copies) should be returned to him within 2 weeks of the appearance of this advertisement.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL (278 Beds. Recognised for F.R.C.S.) RESIDENT HOUSE SURGEONS required beginning of June. Pre-registration candidates eligible.

Applications, with copies of recent testimonials should be forwarded to Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. SOUTHAMPTON GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of Locum SENIOR SURGICAL REGISTRAR at the above Hospital for a period of 6 weeks from beginning of June.

Applications, giving details of experience and enclosing names of 2 referees, should be addressed to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON GENERAL HOSPITAL. (471 Beds. Recognised for F.R.C.S.) RESIDENT HOUSE SURGEONS required beginning of June. Pre-registration candidates eligible.

Applications, with copies of recent testimonials, should be forwarded to Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHEND-ON-SEA HOSPITAL. Temporary Orthopædic REGISTRAR required (full-time) for duty at hospitals in the Southend-on-Sea Group with appropriate responsibilities in the Casualty Department at the General Hospital, Southend. Post vacant 6th June.

Applications, accompanied by copies of recent testimonials, to be sent to the undersigned at the General Hospital, Southend-on-Sea, as soon as possible. J. C. FIELD, Secretary.

SWINDON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. SWINDON HOSPITALS. Applications invited for posts of RESIDENT HOUSE SURGEONS for General Surgical Units of 80 Beds at Victoria Hospital. Recognised for F.R.C.S. and training under pre-registration internship regulations, and vacant on 18th June, and 17th July, 1956. Married accommodation available.

Full details, with names of 3 referees, to Secretary, 7 Okus-road, Swindon, by 26th May, 1956.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE OFFICER (orthopædics) required. Recognised pre-registration post. Hospital recognised for F.R.C.S.

Applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE PHYSICIAN (general medicine and pædiatrics). Pre-registration post.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent, by 28th May.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. SENIOR HOUSE OFFICER (E.N.T.) required, vacant end May. Recognised F.R.C.S. and D.L.O.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. HOUSE OFFICER (general surgery), 2 required, 1 vacant now. Pre-registration posts. Hospital recognised for F.R.C.S.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

SWINDON HOSPITAL GROUP. (537 Beds.) Applications invited for the appointment, now vacant, of RESIDENT SENIOR HOUSE OFFICER as Casualty Officer and Orthopædic House Surgeon at Great Western Hospital, Swindon. Post recognised by R.C.S. for 6 months of years training under Fellowship regulations. Work of Accident and Orthopædic Department, associated with Nuffield Orthopædic Centre (Wingfield Morris Orthopædic Hospital), Oxford, includes large number of industrial injuries. Salary £745 p.a., less £145 p.a. for residential emoluments.

Full details and names of 3 referees to Secretary, 7, Okus-road, Swindon, Wilts, as soon as possible.

TAUNTON AND SOMERSET HOSPITAL. Applications are invited for HOUSE OFFICER (general surgery), vacant from 1st July, 1956. Recognised for F.R.C.S. Recognised for pre-registration candidates.

Applications, stating age, nationality and qualifications, together with the names of 2 referees, should be forwarded to the Group Secretary, Taunton Hospital Management Committee, Taunton and Somerset Hospital, Musgrove Park Branch, Taunton, Somerset.

TAUNTON AND SOMERSET HOSPITAL. Applications are invited for HOUSE OFFICER (pædiatric), vacant from 15th June, 1956. Recognised for the D.C.H. Recognised for pre-registration candidates.

Applications, stating age, nationality and qualifications, together with the names of 2 referees, should be forwarded to the Group Secretary, Taunton Hospital Management Committee, Taunton and Somerset Hospital, Musgrove Park Branch, Taunton, Somerset.

TAUNTON AND SOMERSET HOSPITAL. Applications are invited for HOUSE OFFICER (medical), vacant from 1st June, 1956. Recognised for pre-registration candidates.

Applications, stating age, nationality and qualifications, together with the names of 2 referees, should be forwarded to the Group Secretary, Taunton Hospital Management Committee, Taunton and Somerset Hospital, Musgrove Park Branch, Taunton, Somerset.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. HOUSE PHYSICIAN required for post vacant 15th June. Preference given to persons seeking pre-registration post.

Applications, stating age, experience, and qualifications with dates, together with copies of 2 testimonials, to Secretary.

TUNBRIDGE WELLS. KENT AND SUSSEX HOSPITAL. (301 Beds.) TUNBRIDGE WELLS GROUP HOSPITAL MANAGEMENT COMMITTEE. Pre-registration HOUSE SURGEON (Male or Female) required. General surgery. Vacant 18th June.

Apply, giving age, qualifications, experience and copies of 2 recent testimonials, to Hospital Secretary.

TORQUAY. TORBAY HOSPITAL. Resident Casualty OFFICER (Senior House Officer status), required approximately mid-June. There is a complement of 5 Resident House Officers.

Applications (quoting F.955/71), stating qualifications, nationality, age, with copy testimonials, to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay.

TORQUAY. TORBAY HOSPITAL. (166 general beds.) RESIDENT HOUSE OFFICER (surgical) Male or Female, required middle June. Post recognised for F.R.C.S. and pre-registration purposes. There is a complement of 5 Resident House Officers.

Applications, stating qualifications, nationality, and age together with copy testimonials (quoting reference F.955/70), to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

TORQUAY. TORBAY HOSPITAL. (166 acute general beds.) HOUSE OFFICER (medicine), Male or Female, required early July, 1956. Pre-registration appointment. General duties which will include some work in the E.N.T., Ophthalmic and Radiotherapy Departments.

Applications, stating qualifications, nationality, age, together with copy testimonials (quoting Ref. F.955/69), to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

WARLINGHAM PARK HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for appointment of SENIOR REGISTRAR. Opportunity will be given for experience in all branches of psychiatry, psychoneurosis, industrial psychiatry, delinquency, and child guidance. Candidates may visit the Hospital by arrangement with the Medical Superintendent.

Application forms obtainable from Group Secretary, Warlingham Park Hospital, Warlingham, Surrey, should be returned within 14 days from the date of this advertisement.

WARRINGTON INFIRMARY. (172 Beds.) Applications are invited from persons experienced in anæsthetics for the post of RESIDENT ANÆSTHETIST (Male or Female), Graded as Senior House Officer. The Hospital is recognised for the D.A. examination. Salary is £745 p.a., less a deduction of £130 p.a. for residential emoluments.

Applications, stating qualifications and experience, should be sent to— H. L. BOOT, Group Secretary,
Warrington and District Hospital Management Committee.
c/o General Hospital, Warrington, Lancs.

WALTHAM ABBEY, ESSEX. HONEY LANE HOSPITAL. Locum JUNIOR HOSPITAL MEDICAL OFFICER required 2nd–24th June, 1956. Experience infectious diseases or pædiatrics desirable.

Applications, giving qualifications and experience, to Hospital Secretary as soon as possible.

WELSH REGIONAL HOSPITAL BOARD.

REGISTRAR in Anæsthetics to serve Pontypridd and Rhondda Hospital Management Committee area. Based at East Glamorgan Hospital, Church Village, near Pontypridd, may also be expected to serve other hospitals within Group. Resident/non-resident.

REGISTRAR (obstetrics and gynæcology). Based East Glamorgan Hospital, Church Village, expected to visit other hospitals in Group. Recognised for D.Obst.R.C.O.G. and M.R.C.O.G. Resident.

REGISTRAR (general surgery). Based at Caerphilly District Miners' Hospital, Caerphilly, Glamorgan. Married or single quarters may be available.

REGISTRAR in Orthopædic Surgery. Based at Prince Edward War Memorial Hospital, Rhyl, to serve Clwyd and Deeside Hospital Management Committee. Also required to assist in treatment of long-stay orthopædic cases at area sanatorium.

Subject to review end of first year.

Application forms from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

WHITEHAVEN HOSPITAL, Cumberland. (124 Beds. Pre-registration post, recognised F.R.C.S.(Ed.).) HOUSE SURGEON (first, second, or Senior House Officer post), vacant now.

Detailed applications, with dates and names of 2 referees, to Secretary, Workington Infirmary, Cumberland.

WREXHAM WAR MEMORIAL HOSPITAL. (230 Beds.) WREXHAM, POWYS AND MAWDDACH HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER (resident or non-resident) for the Casualty Orthopædic Department of the above Hospital. The appointment is recognised for the Diploma of F.R.C.S. (Eng. and Edin.), and is subject to a limited tenure of 2 years, which may be reviewed at the end of that period. Salary £775–£50–£1075 p.a. Whitley council conditions of service.

Applications, giving details of age, qualifications, and previous experience, together with copies of 2 recent testimonials, should be sent to the Group Secretary, Maelor General Hospital, Wrexham, as soon as possible.

WREXHAM. MAELOR GENERAL HOSPITAL. (591 Beds.) Applications are invited for the post of HOUSE SURGEON at the above Hospital, to commence duties on 28th June, 1956. The appointment is recognised for the Diploma of F.R.C.S. (Eng. and Edin.) and is a pre-registration post.

Applications, stating age, nationality, qualifications and experience, with copies of 2 recent testimonials, to be sent to the Group Secretary, Maelor General Hospital, Wrexham, as soon as possible.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOSPITAL. (315 Beds.) HOUSE PHYSICIAN (pre-registration), vacant 1st July.

Applications, with copies of 2 testimonials, to the Group Secretary.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOSPITAL. (315 Beds.) HOUSE SURGEON to the Senior Surgeon, vacant 1st July.

Applications, with copies of 2 testimonials, to be sent to the Group Secretary.

WATFORD PEACE MEMORIAL HOSPITAL AND SHRODELLS HOSPITAL, WATFORD. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. SURGICAL REGISTRAR required at above Hospitals which may be visited by direct appointment. Post recognised for F.R.C.S. Post vacant immediately.

Application form obtainable from, and returnable to, the Secretary, West Herts Group Hospital Management Committee, 9, Rickmansworth-road, Watford, Herts, by not later than 10 days after the appearance of this advertisement.

WINDSOR. KING EDWARD VII HOSPITAL. House PHYSICIAN required (Male or Female) for post vacant 12th July. Preference given to persons seeking a pre-registration post. Applicants required to be members of a Medical Protection Society.

Applications, stating age, qualifications with dates, nationality, and copies of 3 recent testimonials, to Secretary.

WINDSOR. KING EDWARD VII HOSPITAL. House SURGEON (general surgery), required, Male or Female, for post vacant 1st July. Recognised for F.R.C.S. Preference given to persons seeking a pre-registration post. Applicants required to be members of a Medical Protection Society.

Applications, stating age, nationality, qualifications with dates, with copies of recent testimonials, to Secretary.

WINDSOR. KING EDWARD VII HOSPITAL. House SURGEON in General and Orthopædic Surgery required, Male or Female, for post vacant 3rd July. Recognised for F.R.C.S. Preference given to persons seeking pre-registration post.

Applications, stating age, qualifications with dates, and nationality, with copies of recent testimonials, to Secretary.

WOLVERHAMPTON GROUP.

The Royal Hospital, Wolverhampton (An Associated Hospital of the University of Birmingham Medical School)

2 HOUSE OFFICERS (general medicine), vacant mid-July.
1 HOUSE OFFICER (pædiatric), vacant 16th July. Appointment recognised for D.C.H.
1 Locum HOUSE OFFICER (pædiatric), 23rd June–7th July.
3 HOUSE OFFICERS (general surgery), vacant mid-July.
1 HOUSE OFFICER (Locum general surgery). From 1st June for approximately 6 weeks.
Pre-registration posts.
Apply Secretary, with copies of testimonials.

The Royal Hospital (Women's), Park-road West, Wolverhampton

HOUSE OFFICER (gynæcological and obstetric), vacant 27th June. The position is recognised as a combined post for the M.R.C.O.G. and is listed as a pre-registration post by the University of Birmingham.

Apply Secretary, with copies of testimonials.

WORKSOP. VICTORIA HOSPITAL. (122 Beds. Recognised for training for F.R.C.S. examination.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT SURGICAL REGISTRAR required with some duties also at Kilton Hospital, Worksop (190 Beds). There are 125 acute surgical beds at these hospitals and the post offers broad training in general surgery, E.N.T., orthopædic and traumatic surgery. Appointment for 1 year in first instance.

Apply Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 28th May, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

WORTHING HOSPITAL, Lyndhurst-road, Worthing. (Acute General—210 Beds.) The vacancy of HOUSE SURGEON will occur at the end of June, 1956.

Applications from either registered medical practitioners, or pre-registration candidates, stating age, qualifications, experience, nationality and enclosing copies of 2 recent testimonials, to be forwarded to the Hospital Secretary as soon as possible.

A. V. OAKTON, Group Secretary,
Worthing Group Hospital Management Committee.

WORTHING HOSPITAL, Lyndhurst-road, Worthing. (Acute General—210 Beds.) The vacancy of HOUSE PHYSICIAN will occur at the end of June, 1956.

Applications from either registered medical practitioners, or pre-registration candidates, stating age, qualifications, experience, nationality and enclosing copies of 2 recent testimonials, to be forwarded to the Hospital Secretary as soon as possible.

A. V. OAKTON, Group Secretary,
Worthing Group Hospital Management Committee.

CANADA. VICTORIA HOSPITAL, London, Ontario, CANADA. JUNIOR ROTATING INTERNSHIPS offered to graduates of British Isles Medical Schools in 800-Bed General Hospital associated with Medical School. Stipend $100 per month, plus room, board and laundry, beginning 15th June, for 12 months, or later by arrangement.

Apply, with letter from Dean, to Superintendent.

ST. JOHN'S, NEWFOUNDLAND, CANADA. GENERAL HOSPITAL. (475 Beds.) The above Hospital has several vacancies for INTERNES for which applications are invited; salary $2500 p.a., less $480 for maintenance. There is a full teaching programme and the Hospital is fully accredited by the Joint Commission and is recognised by the Royal College of Physicians and Surgeons in Canada for postgraduate training. Transport to St. John's will be paid and on completion of 1 years service return fare to the United Kingdom will be provided.

Applications, with full details as to age, &c., together with names of 2 referees, should be forwarded immediately to—

Dr. E. WILSON, Superintendent.
General Hospital, St. John's, Newfoundland, Canada.

ST. JOHN'S, NEWFOUNDLAND, CANADA. GENERAL HOSPITAL. (475 Beds.) DEPARTMENT OF PATHOLOGY. Applications are invited for the post of RESIDENT REGISTRAR in Pathology at the above Hospital. Work will include clinical, surgical and autopsy pathology. Previous experience in pathology desirable but not essential. The post is recognised for post-graduate training and towards certification in pathology by the Royal College of Surgeons and Physicians of Canada and the American College of Surgeons. Excellent opportunities exist for gaining extensive experience. Salary $2500 p.a., less $480 for maintenance, &c. Transport to St. John's will be paid by the Hospital.

Applications, with full details, &c., to be forwarded to—

Dr. E. WILSON, Superintendent.

General Hospital, St. John's, Newfoundland, Canada.

U.S.A. ST. ELIZABETH HOSPITAL, Covington, KENTUCKY. (400-Bed Hospital.) Required, INTERNES. Internship approved by American Medical Association. Rotate through services in Surgery, Medicine, Pediatrics, Obstetrics, and Emergency Room. Starts 1st July, 1956, and ends 30th June, 1957. Salary $200 per month with maintenance.

Contact above Hospital.

Public Appointments

DURHAM COUNTY COUNCIL. Applications invited from registered medical practitioners (Men and Women) for appointment as SCHOOL MEDICAL OFFICER. Applicants must have had at least 3 years experience in the practice of their profession. Salary scale £975–£50–£1375 p.a.

For further details and form of application apply to undersigned. Completed applications by 2nd June, 1956.

G. H. METCALFE, Director of Education.

Shire Hall, Durham. 30th April, 1956.

FACTORY DOCTORS. Factories Acts, 1937 and 1948. The following appointment as Appointed Factory Doctor is vacant. Apply to Chief Inspector of Factories, 19, St. James's-square, London, S.W.1.

District	*County*	*Latest date for receipt of applications*
MILLOM ..	CUMBERLAND ..	2ND JUNE, 1956

GLOUCESTERSHIRE COUNTY COUNCIL. Applications are invited for the appointment of ASSISTANT COUNTY MEDICAL OFFICER OF HEALTH AND SCHOOL MEDICAL OFFICER (Male). Salary in accordance with the Whitley Council for the Health Services, Medical Council, £975 p.a. rising by £50 to £1375 p.a. (subject to any future award being accepted by the County Council). Commencing salary will be determined on previous experience. Applicants must be registered medical practitioners and possession of a Diploma or Certificate in Public Health would be an advantage. The post is superannuable and is subject to a medical examination. Must be able to drive and possess a motor-car : travelling and subsistence allowances in accordance with the County scale.

Forms of application, with particulars of duties and conditions of appointment, may be obtained from the County Medical Officer of Health, Berkeley House, Berkeley-street, Gloucester, to whom completed applications should be sent by 9th June, 1956. GUY H. DAVIS, Clerk of the County Council.

Shire Hall, Gloucester, 3rd May, 1956.

GOVERNMENT OF TRINIDAD. Pathologist required in Medical Department, Trinidad, to assist Senior Pathologist in pathological and bacteriological work, including anatomy and post-mortem. Candidates must possess medical qualifications registrable in the United Kingdom and preferably qualification in pathology or bacteriology. At least 3 years postgraduate experience essential. Candidates without a D.C.P. or Dip. Bact. should have had at least 6 years postgraduate experience. Appointment can be made on a permanent basis with pension (non-contributory) or on short-term agreement. A candidate in the National Health Service may leave the National Health Service but retain his superannuation rights (up to 6 years) and receive a gratuity of 20% of the aggregate of his salary after the end of his engagement. Salary scale ranges from B.W.I. $6720 to B.W.I. $7200 (£1400–£1500) p.a. (1 B.W.I. $ = 4s. 2d.). Quarters are not guaranteed, but if government quarters are provided a small rental is charged. Where government quarters are not provided an allowance in lieu is payable. Free passages on first appointment for Officer and family not exceeding 5 persons in all, also free passages on leave subject to a maximum of 3 adult fares. Income-tax at local rates. Local leave is permissible and generous home leave is granted after each tour. Tour of service is 3½ years. Educational facilities are available.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD. 117/38/013).

GOVERNMENT OF TRINIDAD. Medical Officer, Grade "A" (Physician), required in the Health Department of Trinidad to take charge of wards, medical clinics, examinations of Civil Servants, Medical Boards, reports on medical subjects and such other duties as the Director of Medical Services may assign. Candidate must be M.R.C.P. or F.R.F.P.S. and have had at least 5 years postgraduate experience. Appointment on agreement for 3 years in the first instance. Candidates in the National Health Service may resign from the National Health Service but retain their superannuation rights during their time abroad (up to 6 years) and receive a gratuity (taxable) of 20% of the aggregate of their salary after their engagements. Salary scale ranges from $(B.W.I.) 7200 to $(B.W.I.) 7680 (£1500–£1600) a year (1 B.W.I. $ = 4s. 2d.). Consulting practice is not permitted, but an allowance at the rate of $960 (£200) a year is payable in lieu. Quarters not provided, but allowance in lieu payable to an Officer recruited from outside the Colony. Free return passages for Officer, wife, and children not exceeding 5 persons in all, children to be under 18, unmarried and dependent upon officer. Income-tax at local rates. Local leave is permissible and generous home leave is granted after tour. Education facilities are available.

Application forms from the Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD. 117/38/09).

GOVERNMENT OF JAMAICA. Medical Officers of HEALTH required to supervise the work of Public Health Nurses, Inspectors and District Midwives, child welfare and prenatal clinics, tuberculosis wards in hospitals and almshouses, and the treatment of venereal disease in hospitals and dispensaries. They will also be responsible for programmes of immunisation, be required to take an interest in insect control, and act as Advisers to the local Board of Health. Appointment on short-term contract for 3 years with possibility of ultimate pensionable employment. Salary scale £1300–£2000 p.a. On satisfactory completion of contract a gratuity of £37 10s. is payable for each completed period of 3 months service. (Not payable if emplaced on pensionable establishment.) Free return passages for Officer, wife, and dependent children under 18 years, not exceeding 5 persons in all. Income-tax at local rates. Local leave permissible and home leave after tour. Climate healthy and Educational facilities available. Candidates must possess medical qualifications registrable in the United Kingdom and the Diploma in Public Health.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD. 117/32/02).

GOVERNMENT OF QATAR. State Medical Service. Applications are invited for the posts of GOVERNMENT PATHOLOGIST and GOVERNMENT RADIOLOGIST under the State Medical Officer, Government of Qatar, Persian Gulf.

Qualifications.—Candidates should hold recognised diplomas in their specialty. The Radiologist should be familiar with deep therapy technique.

Salary.—According to scale M2 starting at Rs.2700 an Arabic month (£2504 7s. 8d. a Gregorian year) with annual increment of Rs.100 a month up to a maximum of Rs.3300.

Gratuity.—Rs.15,500 (assuming a starting rate of Rs.2700 a month) on completion of contract only.

Probation.—Probationary period of 6 months during which contract may be terminated at 3 months notice by the Government without the necessity for stating its reasons.

Contract.—A 5-year contract subject to successful completion of probationary period. The employee may terminate the contract at 3 months notice after completing 1 year of service.

Accommodation.—Free furnished bachelor accommodation, fuel, light and water. Married accommodation will be provided in accordance with the rules, but in no case before successful completion of probationary period.

Leave.—Will be earned at the rate of 6 days for each completed month of duty.

Free Travel.—On first journey to Qatar, leave (not exceeding 1 return first-class B.O.A.C. passage in each year) and termination, for applicant, wife, and children up to 18 years of age.

General.—The climate is hot for about 5 months of the year but this is offset by air-conditioning in staff houses and offices (as also in the Hospital). Good climate for the rest of the year. No income-tax. Duty car allowance. Free medical and dental treatment.

Applications endorsed either "Government Pathologist" or "Government Radiologist" (as the case may be), giving full personal particulars, including age, education, nationality, marital status, religion, qualifications, training, past experience and employment, names of 3 referees and dated photograph, should be sent in duplicate to the Adviser to the Government of Qatar, P.O. Box 36, Doha, Qatar, Persian Gulf. 2 further copies of the application and attachments similarly endorsed, should be forwarded to C. TENNANT SONS & CO. LTD., 4, Copthall-avenue, London, E.C.2.

HER MAJESTY'S OVERSEA CIVIL SERVICE. Medical BRANCH—MAURITIUS. MEDICAL OFFICER OF HEALTH required in the Medical Department in Mauritius to deal with all matters affecting the health of the district assigned to him ; coördinate the activities of the Social and Health Services ; direct the work of all sanitary staff in the district ; and assist in the training of local health staff. Candidate's must have medical qualifications registrable in the United Kingdom and possess the Diploma in Public Health. Appointment can be made on a permanent basis with pension (non-contributory) or on contract (with gratuity) for 3 years. Salary scale is Rs.11,700–Rs.19,020 (£877 10s.–£1426 10s.) a year. Temporary non-pensionable cost-of-living allowance of 11% on salary not exceeding Rs.12,000 (£900) a year and 8% on salary over Rs.12,000 (£900) p.a. Gratuity of £37 10s. for each completed period of 3 months while salary is below £1000 a year and £50 when salary is over £1000 a year. Government of Mauritius would pay employer's share of pension contributions (if applicable). Quarters are not provided, but officers who have not been allocated Government houses will be reimbursed any difference between approved rent paid for a private house (subject to a maximum of Rs.250 (£18 15s.) a month) and the 10% salary they would normally pay for a Government house. For this purpose, Officers residing in hotels or boarding-houses will be regarded as paying half for the first 21 days, and then a quarter of the board and lodging charge for themselves and their wives in respect of rent. Income-tax at local rates. Free passages in both directions for Officer, wife and children not exceeding 5 persons in all. Generous home leave after each tour of 3 or 4 years.

Application forms from the Director of Recruitment, Colonial Office, London, S.W.1 (reference No. BCD. 117/52/02).

TRISTAN DA CUNHA. Doctor required for general medical duties on South Atlantic Island of Tristan da Cunha. Appointment would be on agreement for 2 years. Salary £1200 a year. Free quarters provided equipped with heavy furniture, for which a small rental may be charged. Free passages provided for Officer, wife and up to 3 children to and from the Island. Generous home leave granted after tour. Private practice is not permitted. Special importance will be attached to suitability of personal qualities for service in this small, remote but distinctive community. Candidates must possess medical qualifications registrable in the United Kingdom.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD. 117/170/02).

HER MAJESTY'S OVERSEA CIVIL SERVICE. Sierra LEONE. A SENIOR PATHOLOGIST is required for service in the Medical Department of Sierra Leone. Duties include clinical pathology and forensic medicine. Candidates must be registered by the General Medical Council in the United Kingdom or possess qualifications entitling them to such registration, and must have a higher qualification in pathology or at least 7 years practical experience in the specialty.

Appointment may be made as follows :—

(*a*) On 3 years probation for permanent and pensionable employment. Pensions (which are non-contributing) are at the rate of 1/600th of the final pensionable emoluments for each completed month of reckonable service.

(*b*) From the National Health Service. Candidates may resign but retain their superannuation rights up to 6 years and receive a gratuity (taxable) of 20% of the aggregate of their salary.

Salary, under (*a*) or (*b*), is £2320 a year, which includes pensionable expatriation pay and an annual special allowance.

(*c*) On short-term contract (2 tours of 18–24 months duration each) with inclusive salary of £2502 a year. On completion of contract a gratuity (taxable) is paid at the rate of £37 10s. for each completed period of 3 months service (including leave).

Quarters are normally available at low rental. Free return passages for Officer when travelling on first appointment and on duty and on leave. Free passage for wife once each way in each tour of service.

Officer selected may be granted either (but not both) of the following concessions in any one tour of service :—

(*a*) 1 return sea passage for each of 2 children under 19 years of age (permission required before children may enter Sierra Leone) ; or

(*b*) An allowance of £75 a year for each of 2 children maintained outside Sierra Leone for the whole of the tour.

Income-tax at local rates. Local leave is permissible and generous home leave is granted after each tour of 18–24 months duration. The short tours of service enable frequent visits to be made to children being educated at home. Many Officers have their children with them until they reach school age.

Application forms from the Director of Recruitment, Colonial Office, Sanctuary Buildings, Great Smith-street, London, S.W.1 (quoting reference No. BCD. 117/15/09).

LINDSEY COUNTY COUNCIL. Health Department. Applications are invited from fully qualified medical Women for post of ASSISTANT MEDICAL OFFICER for Maternity and Child Welfare for Horncastle, Louth and Skegness area of Lindsey. Salary in accordance with award of industrial court regarding salaries of Assistant Medical Officers—i.e., £975 p.a., rising by annual increments of £50 to maximum of £1375 p.a.

Further particulars and forms of application obtainable from undersigned. C. D. CORMAC, County Medical Officer.

P.O. Box No. 26, County Offices, Lincoln, 3rd May, 1956.

LONDON COUNTY COUNCIL. Applications are invited from registered medical practitioners practising under the National Health Service, for appointment as VISITING MEDICAL OFFICER to 367, Fulham-road, S.W.10, a large Welfare Home for homeless mothers and children. Annual remuneration £225, exclusive of fees receivable from the Executive Council (maximum number to be taken on to the National Health Service list of person appointed not likely to exceed 500).

Application form and further particulars obtainable from the Medical Officer of Health (PH/D.1), The County Hall, S.E.1. Closing date for applications 31st May (916).

NORWICH. CITY OF NORWICH. Applications are invited from Female registered medical practitioners for the post of ASSISTANT MEDICAL OFFICER OF HEALTH AND SCHOOL MEDICAL OFFICER. Salary scale £975 rising by annual increments of £50 to £1375 p.a., subject to the increase recently agreed by the Medical Whitley Council.

For further particulars apply to the Medical Officer of Health, 68, St. Giles-street, Norwich.

SALFORD. CITY OF SALFORD EDUCATION COMMITTEE. Applications are invited for the post of ASSISTANT MEDICAL OFFICER OF HEALTH AND SCHOOL MEDICAL OFFICER for 3 sessions per week at the rate of £2 5s. per session. Candidates should possess D.C.H. or D.P.H. Duties are inspection of pupils, maternity and child welfare, and such other work as may be directed.

Application forms from the Director of Education, Education Office, Chapel-street, Salford, 3.

R. RIBBLESDALE THORNTON, Town Clerk.

YORKSHIRE. COUNTY COUNCIL OF THE WEST RIDING OF YORKSHIRE. Applications are invited from registered medical practitioners, Men or Women, for the post of ASSISTANT COUNTY MEDICAL OFFICER AND SCHOOL MEDICAL OFFICER in the Batley area of the County. The Assistant will be on the staff of the County Medical Officer's Department but will work under the administrative direction of the Divisional Medical Officer for the area. The duties will be mainly clinical in the School Health and Infant Welfare Services, but other health duties may be included by the Divisional Medical Officer. The scale of salary is £975 p.a. rising by annual increments of £50 to £1375 p.a. A minimum of 3 years experience since qualification is desirable and the possession of a Diploma in Child Health will be an advantage. Travelling and subsistence allowances according to the County Council's scale are payable in addition to salary. The post is superannuable and the successful applicant will be required to pass a medical examination as to physical fitness.

Forms of application can be obtained from the undersigned, to whom they should be returned not later than 2nd June, 1956.

J. WOOD-WILSON, County Medical Officer.

County Hall, Wakefield.

SHEFFIELD. CITY OF SHEFFIELD. Public Health DEPARTMENT. Applications are invited for the appointment of DEPUTY MEDICAL OFFICER OF HEALTH at a salary of £1733 6s. 8d., rising by annual increments of £100 to a maximum of £2033 6s. 8d. A revision in the light of the recent award is under consideration. Applicants must be registered medical practitioners, holding the Diploma in Public Health, and with experience in the administration of the Public Health Services. The appointment is superannuable, and the person appointed will be required to pass a medical examination and to devote the whole of his time to the service of the Council.

Applications (which must be made on a form to be obtained from me) containing the names of 3 persons to whom reference may be made, must be received by me not later than 9th June, 1956, endorsed "Deputy Medical Officer of Health." Canvassing, whether direct or indirect, is prohibited and will be a disqualification. Further information can be obtained from Dr. Llywelyn Roberts, Medical Officer of Health, P.O. Box 78, Town Hall Chambers, Sheffield, 1.

Town Hall, Sheffield, 1. JOHN HEYS, Town Clerk.

General Practice

For an Executive Council post (England and Wales) apply on form E.C.16A *obtainable from the council. Mark envelope "Vacancy."*

EXECUTIVE COUNCIL FOR THE COUNTY BOROUGH OF MERTHYR TYDFIL. Applications are invited from medical practitioners wishing to undertake General Medical Services in the Merthyr Vale, Aberfan and Troedyrhiw District, of the County Borough of Merthyr Tydfil. The Practice vacant is single-handed and at present comprises approximately 1760 patients. The successful applicant will be required to obtain suitable surgery accommodation in the area.

Applications on Form E.C.16A (obtainable from the address given below) should be sent to the undersigned and should be received not later than 11th June, 1956.

I. PRITCHARD,
Clerk of the Merthyr Tydfil Executive Council.
"Glasdir," 24, Victoria-street, Merthyr Tydfil.

Hospital Services : Non-Medical Appointments

ROCHDALE AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. The whole-time post of BIOCHEMIST to the Rochdale Group of hospitals is now vacant and applications will be considered at Senior basic grade level according to qualifications and experience. The successful applicant will be required to work under the Consultant Pathologist and to perform biochemical estimations and examinations for the hospitals and clinics of the Group. Further details may be obtained from the Group Pathologist, Birch Hill Hospital, Rochdale. Commencing salary dependent on qualifications and experience rising to a maximum of £1230 p.a. (senior grade).

Applications, together with names and addresses of 3 referees, should be forwarded to the Group Secretary, Central Offices, Birch Hill Hospital, Rochdale, Lancs, as soon as possible.

Miscellaneous

The Medical Journal of Australia. Appointment of Assistant Editor. The Directors of the Australasian Medical Publishing Company, Limited, wish to appoint an Assistant Editor to *The Medical Journal of Australia*. The present editorial staff consists of the Editor, a Deputy Editor, and a Lay Sub-Editor. The Directors wish the appointment of Assistant to be a full-time appointment ; the appointee will be asked to serve a 6 months probationary period.

Applicants should state their age and give details of their education at school and university and of their postgraduate experience and should be not over the age of 35 years. They should state whether they have had any experience in literary work and whether they have any knowledge of foreign languages. The appointee will be expected after the probationary period to declare an intention to adopt medical journalism as a career. The initial salary offered will be £A1850 p.a. with superannuation. Applications, which will close on 31st July, 1956, should be forwarded to the Secretary, Australasian Medical Publishing Company, Limited, The Printing House, Seamer and Arundel-streets, Glebe, New South Wales.

Nurse receptionist required for holiday duty for doctor's private practice in Westminster. 11th–29th June, 9.30 A.M.–7 P.M. Saturday half-day. Sunday off.—Address, No. 222, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

"Pregnancy Diagnosis by the Xenopus Method," 24-hour service. Send specimen of urine and £1 1s. fee. Hæmatology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

Doctor, experienced in both advertising, &c., and clinical aspects of pharmaceutical and allied products, seeks part-time position.—Address, No. 223, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Applicants for posts requiring testimonials copied or duplicated should communicate with MANTON SECRETARIAL SERVICE LTD., 98, Victoria-street, S.W.1 (Phone : VICtoria 0141), who are specialists in this kind of work.

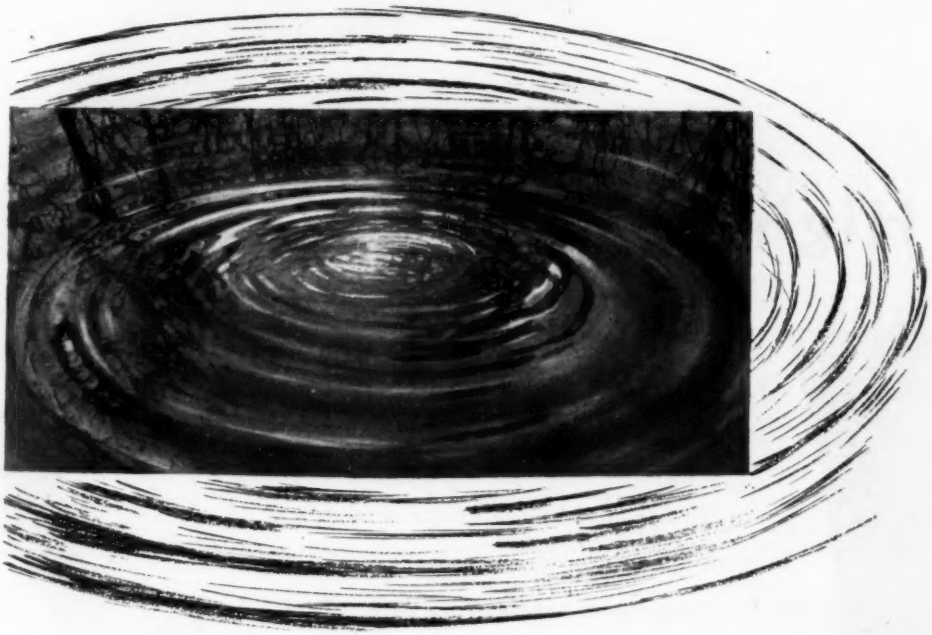
Typewriting and Duplicating. First-class work at moderate prices by experienced medical typists. Electric machines.—SYBIL RANG, 21, Heath-street, Hampstead, London, N.W.3 (HAM 5329/0504).

New Austin Cars from £270 13s. 6d. down, 24 payments £13 4s. 4d.—SAUNDERS, Austin House, 140, Golders Green-road, Golders Green, London, N.W.11.

For sale. Electro-cardiograph (suitcase model) made by Cambridge Instrument Company. £75. Can be seen in Leeds. —Telephone : Leeds 659429.

PUBLISHED by the PROPRIETORS, THE LANCET LIMITED, 7, Adam Street, Adelphi, in the County of London.
Printed by HAZELL, WATSON & VINEY, LTD., London and Aylesbury—Saturday, May 19, 1956.
PRINTED IN GREAT BRITAIN—Entered as Second Class at the New York, U.S.A., Office.

PROLONGED ACTION...



8 to 24 hours of allergy relief from a single dose of DI-PARALENE REGD.

Allergy patients like the convenience, effectiveness and economy of this longer-acting antihistamine. Clinical reports show that DI-PARALENE, with its piperazine side chain rather than one of the conventional type, in many cases provides twenty-four hours of relief with a single dose.

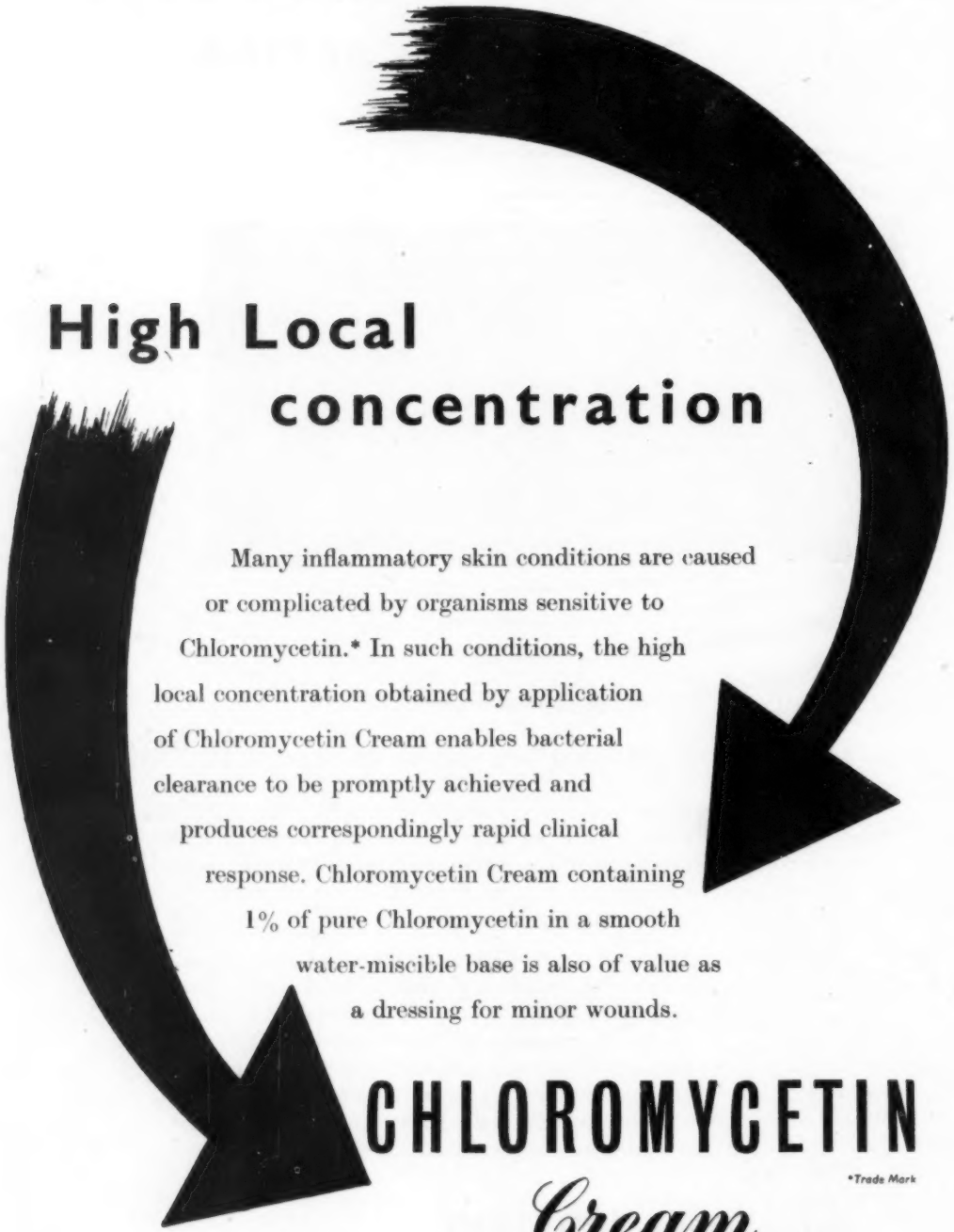
Administer DI-PARALENE initially in 50 mg. doses three times a day for the average adult patient. In the majority of cases, the dosage can soon be reduced to once or twice a day. 50 mg. at bedtime often provides symptomatic relief throughout the night and frequently no additional dosage is required until the next bedtime. Side-effects are comparatively few and mild. Prescribe this longer-acting DI-PARALENE on your difficult allergic conditions. It is available in 50 mg. *Filmtabs* in bottles of 25, 100 and 500.

*Filmtab** **DI-PARALENE** REGD. (CHLORCYCLIZINE HYDROCHLORIDE, ABBOTT)

* *Regd. Trade Mark for Abbott's Film-sealed tablets, patent applied for.*

Abbott

ABBOTT LABORATORIES LIMITED · PERIVALE · GREENFORD · MIDDLESEX



High Local concentration

Many inflammatory skin conditions are caused or complicated by organisms sensitive to Chloromycetin.* In such conditions, the high local concentration obtained by application of Chloromycetin Cream enables bacterial clearance to be promptly achieved and produces correspondingly rapid clinical response. Chloromycetin Cream containing 1% of pure Chloromycetin in a smooth water-miscible base is also of value as a dressing for minor wounds.

CHLOROMYCETIN

*Trade Mark

Cream

Packed in collapsible 1-oz. tubes

MEDICAMENTA VERA

PARKE, DAVIS & Company, Ltd. *(Inc. U.S A.)* Hounslow, Middlesex, Tel: Hounslow 2361

223